GPS2CAD

User's Manual

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Table of Contents

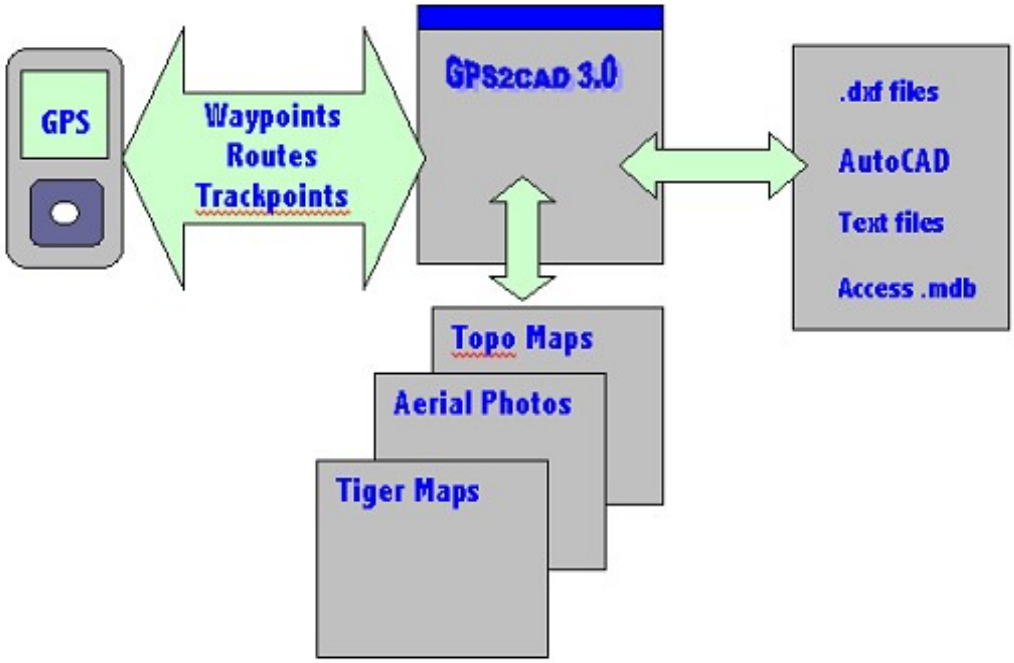
Welcome 3
What's New 3
Video Help 4
Quick Start 4
The IMPORTANT Stuff 6
Purchasing 6
Purchase On Line 6
Upgrading 6
Quick Look 7
Tour 7
Features 8
Preferences 9
Grids and Units 9
GPS Units 11
ACAD Settings 12
Misc 12
the MAIN PROGRAM 13
Splash Screen 13
Open/Save Projects 14
Connecting to GPS 14
Downloading Points and Routes 16
Grid Columns 18
Sorting Points 20
Main Window Controls 21
Direction Distance Grid 22
Round-off 23
Working with AutoCAD 24
Sending Points TO AutoCAD 24
Getting Points from AutoCAD 25
Points and Routes 25
Editing Points and Routes 25
Selecting and Unselecting Points 26
Adding / Deleting Points and Routes 26
Moving Points in the grid 27
Maps 28
Sample Maps 28
Map Window Controls 31
Viewing Selected Points 32
Using the Preview Map 33
Viewing the Map Window without points 34
Deleting Points and Routes 35
Zoom To Point 36
Add Points 37
Moving around on a map 38

Deleting points on Map 38
About Map Scale/Zoom 39
About using the maps in AutoCAD 40
Real Time Capture 40
Capturing Points 40
To Access 42
Printing 43
Printing 43
Print Preview 44
Print Setup 45
Importing and Exporting data 46
Introduction 46
Importing Points FROM AutoCAD 47
Importing from Garmin's MapSource 49
Importing from Magellan's MapSend 52
Importing from Other 55
Get Points tab 55
Type of Points tab 56
Datum Selection tab 58
Zone Selection tab 58
Column Assignments tab 59
Grid Selection tab 63
Select Points tab 65
Verify and Import tab 66
Exporting Points 67
Select File 67
Select Points 69
Select Columns 70
DXF Info 71
Export 72
Knowledgebase and FAQ's 73
Knowledgebase and FAQ's 73
The FUN Stuff 73
FUN Activites 73
The OTHER Stuff 74
GPS2CAD Supported Projections 74
Other Resources 75

Welcome

GPS2CAD is a powerful program that allows you to connect to a portable GPS device, download the waypoints, routes, and trackpoints, and do some amazing things with them:

- Convert them to the datum of your choice and plot them in AutoCAD
- Automatically view them on Aerial Photos, Topo maps, or Tiger maps (census maps) all retrieved from TerraServer-USA, one of the largest repositories of public domain mapping on the net
- Export them to a variety of formats for use in other programs
- Edit the points
- Upload them back to your GPS unit.



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What's New

Product revisions - you can view the latest revisions to GPS2CAD on the website: click here

Help Document Revisions: the following is a list of the changes to this help document

1-28-2005	Updated Help files to match Version 3.5. Includes major sections on: • Information on the new website GPS2CAD.com • Information on new Video Help Files • Importing points from AutoCAD • Importing points from Garmin's MapSource • Importing points from Magellan's MapSend • Importing points from Other sources • Exporting points to several formats • Saving/Opening Project Files
6-24-04	Added: • Magellan Support • 3D plotting for points and blocks • Options to regen and zoom extents in ACAD during real time capture • Button to Sort Points in grids Fixed: • Altitude wasn't being recovered during some point downloads • Oversize pictures in help file • All three direction-distance grids now work together • Fixed error that occurred when clicking the cancel button during a .dxf import/export • fixed a program crash when exporting dxf files to a drawing that was open in ACAD
3-25-04	Added What's new section Added FAQ about plot preview click here

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Video Help

In order to make GPS2CAD even easier to use, a library of "Video Help Files" is maintained on the website GPS2CAD.com. Click Here to view them. This is an on-going project, so if you don't see what you need check back at a later time.

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Quick Start

The following steps will get you going simply and easily:

- Start GPS2CAD Ver. 3.5
- From the File Drop down menu select Preferences

In the Preferences Window

- Select the “GPS Setup” tab

- Make the following selections:
  - The com port your GPS is connected to.
  - The make of the GPS unit
  - GPS model type. The Garmin model types are distinguished by the number of symbols they maintain internally, either 16 symbols for early models, or greater than 16 symbols

NOTE:
Magellan units must be set to a baud rate of 4800, and the NMEA string = V2.1 GSA. To do this, use the menu button on the GPS unit to set these values: press Menu\Setup\Baud Rate\4800 Baud and Menu\Setup\NMEA\V 2.1 GSA

Select the "ACAD Settings tab and choose:

- The Layer and Scale for plotting Blocks in AutoCAD
- The Layer and Color for plotting lines and points in AutoCAD

Select the “Grid and Units” tab

- Select the desired output datum. To start, we recommend American Projections/UTM_NAD_27. This is the default setting for translating from WGS 84 datum
- From the Units drop down box select US_Foot (best used for everything except the unique American datums
- Leave the other settings at their default values
- Click “Save and Close” button

In the Main Window

- From the Main Form, click “Connect GPS”
- Wait for the green light to appear indicating "Connection OK"
- Click “Get Waypoints”

The points are loaded.....

Viewing Maps

Left click in the point grid and drag to highlight the points you want to view or plot

- To view the points on a TerraServer-USA map, click “View Points” for an Aerial, or select the down arrow and then the map type you want.

Plotting in AutoCAD

- Start AutoCAD, begin a drawing, and then minimize the session of AutoCAD
- Return to GPS2CAD.
- Select the points to plot in the Waypoint Grid
- Click the “Plot Lines” button to plot the points as lines
- You will receive a “Plot Complete” message
- Return to AutoCAD to view the points

That’s all there is to the Quick Start!

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The IMPORTANT Stuff

Purchasing

Purchase On Line

How To Purchase GPS2CAD

Purchasing GPS2CAD is quick and easy:

- On the File drop down menu, select "Purchase". This will take you to our credit card processing site known as "ShareIT"
- Select the license model you want. Four are available:

Single license - entitles you to one copy of the program

Combo license - entitles you to three copies of the program, one office, one laptop, one home

Site license - entitles you to use the program on all the computers at one site. This means a single street address. If a company that buys it has branch offices in several locations, a site license permits you to use the program at one site.

World license - entitles you to use the program at all the branch offices of a single company. This does not include affiliate companies, or companies owned by one which purchases the program. It's one company - i.e. "XYZ Corporation", world wide.

- Follow the online instructions for purchasing. Note that there are also provisions for ordering by fax or purchase order.
- Once the funds clear, you will be mailed a user name and release code. KEEP THESE IN A SAFE PLACE! YOU WILL NEED THEM FOR ANY RE-INSTALLATION. KEEP THEM IN A COMPUTER FILE BECAUSE THE RELEASE CODE IS VERY LENGTHY, AND BEST ENTERED BY "CUT AND PASTE"
- Once the release code has been accepted by GPS2CAD, re-start the program. The 5-point restriction is removed, and the main window header no longer reads "Demo Version..."

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Upgrading

When upgrading to the latest version of GPS2CAD, you may need to do an uninstall of the old

version and a new install of the latest version. The program uses Install Shield and is a straight-forward process.

When upgrading from a 3.1.xx version to 3.5.xx version, a new license key is required. This is a no-cost upgrade, and the keys are available from the publisher for paid owners. See the website www.gps2cad.com for contact information.

When upgrading within the 3.5 series, the same license key should continue to work as it did before (you kept it, right?).

The first thing you should do upon beginning the new version is to go into the setup and verify your preference settings; you may have to re-apply the correct settings.

As always with a computer, BACK UP YOUR HARD DRIVE before installing new software, including GPS2CAD!

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Quick Look

Tour

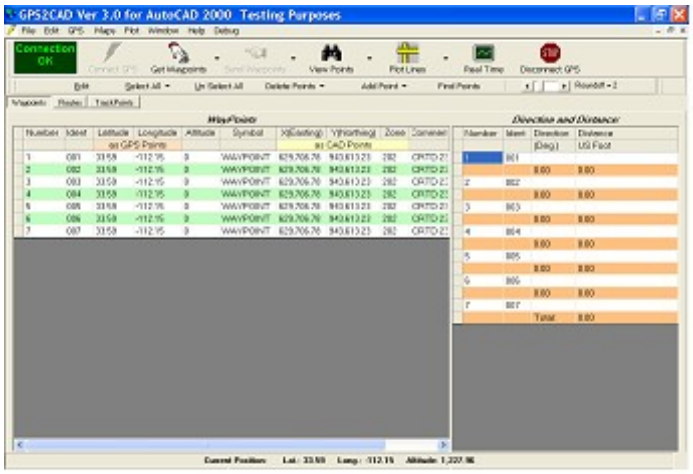
Main features:

- Works with most Garmin and Magellan GPS receivers
- Imports waypoints, routes, and tracks
- Works with AutoCAD versions 14.01, 2000,2002,2004, 2005
- Plots the points on public domain Aerial Photos, Topo Maps, and Tiger Maps
- Works in English and Metric units, including the U.S. foot (slightly different than "International" foot)
- Exports and imports Waypoints, routes, and track points to/from
    - .dxf files for use in other CAD programs, including AutoCAD Lt.
    - Access 2000 .mdb
    - Text files – comma, tab, or space delimited
    - Garmin MapSource
    - Magellan MapSend

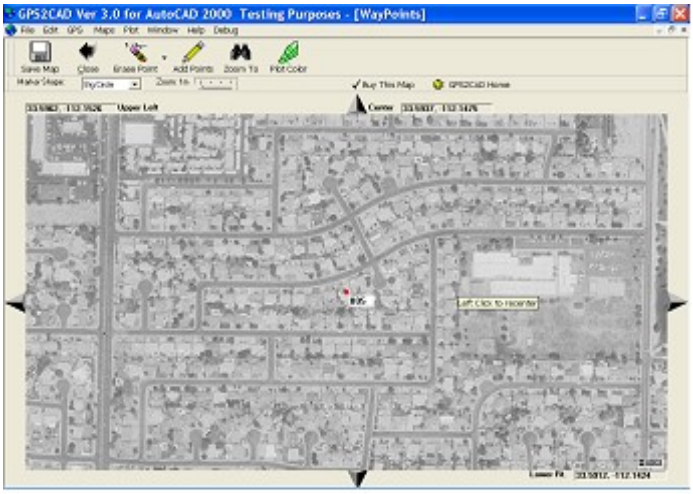
- Built in Help files (you're reading them!) that are web-based so you always have a current version
- Video Help Files
- Performs "Real Time" capture of points, with output to the main grid, AutoCAD, or an Access Database.
- Supported by a dedicated website at www.gps2cad.com

There are two main components:

The main screen, where the points are stored and edited:



The Mapping windows, where your choice of Aerial, Topo, or Tiger maps are displayed:



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Features

AutoCAD Features

- Can select to plot points (AutoCAD Nodes), lines (AutoCAD Light weight polylines), or blocks
- 3D plotting of points and blocks into AutoCAD
- Allows the manipulation/relocation of points within AutoCAD and then the reload of the points back to GPS2CAD, and back to the GPS unit.
- Real time capture and plotting of points! Yes, you can drive around the city with your GPS and laptop operating, and watch the lines appear tracing your route

Mapping Features

- Plots the points on public domain maps from TerraServer-USA, a joint venture between the U.S. Geological Survey department and Microsoft
    - Aerial photos at 4 resolutions
    - Tiger maps (census maps)
    - Topographic maps at various resolutions
- Scroll to new locations on the maps, or define the location to view by latitude/longitude
- Plots a preview map showing points, lines, and labels

- Allows the placement of new points on a photo/topo map, and then sending that point back to the main grid for AutoCAD plotting or upload to GPS
- Allows saving the map/point image to a file
- Provides a convenient internet link to buy the map you are viewing
- Allows addition/deletion of points to the map and the main grid

Preferences
- Select an output from 46 different artesian grid systems covering most of the world, including United States, Britain, Europe, Australia, and New Zealand
    - UTM
    - NAD 27
    - NAD 83
    - State Plane Coordinate systems
- User selectable round off of numeric data (full numeric data is preserved for calculations)
- Provides short help notes about the datums
- Selection of plotting layer and color for AutoCAD

Import/Export Features
- Exports .dxf,
- Imports/Exports text files (comma, tab, or space delimited)
- Imports/Exports Microsoft Access 2000 database

Printing Features
- Prints copies of waypoints, routes, and trackpoints
- Print Preview function

Other features
- Web based purchase, with almost immediate access to the release code

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Preferences

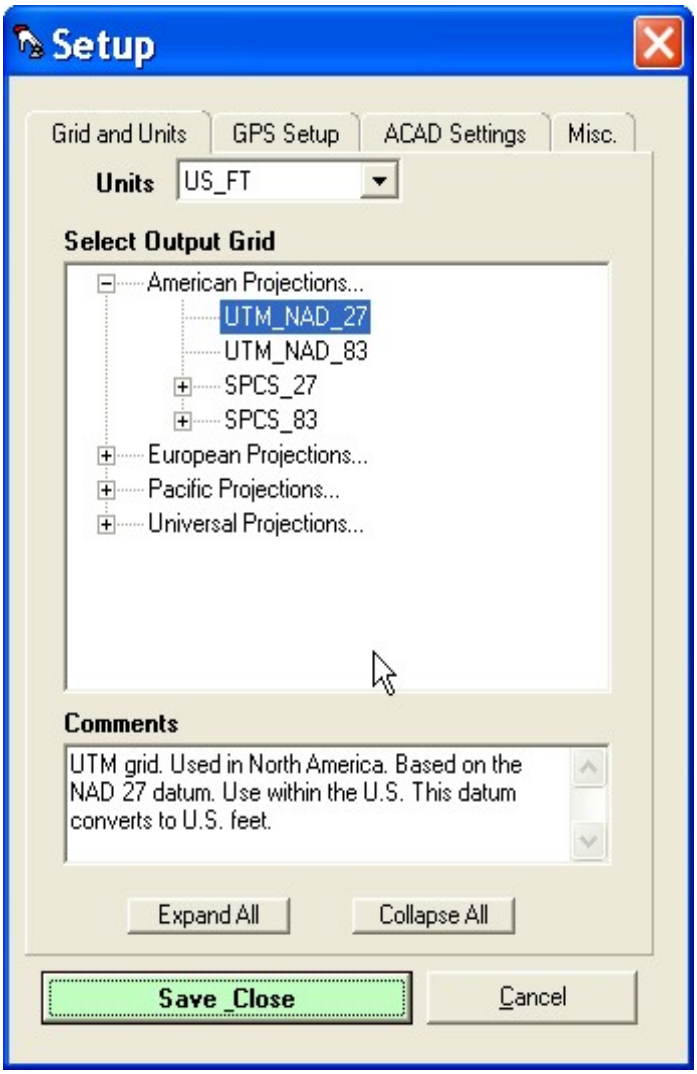
Grids and Units
The native format for points in the GPS receiver is WGS 84, a Latitude/Longitude format. Since this is not compatible with X,Y,Z of CAD programs, they are converted to one of many Cartesian (X,Y,Z) formats available around the world. In the "Grids and Units" tab of Preferences you specify the Output Datum and Units for the converted points.

There are several Units available to choose from:
- INT_FOOT - an International Foot, which is defined as 0.3048 Meters
- US_FOOT - used primarily with American projections, especially the State Plane Coordinate System. The US_FOOT is defined as 0.304800609601 Meters or (1200/3937) x Meters
- METERS - The native format of the GPS. It is also the standard measurement for UTM grids
- IRISH_FOOT - used with surveys in Ireland. Defined as .3048007491 Meters

It's IMPORTANT to understand that these four UNITS are used to convert the GRID COORDINATES shown when the program receives the points from the GPS unit. The numbers affected by these units are those in the "As CAD Points" column of the grid.

There is another Units drop-down box shown with the "Direction Distance" grid of the main program window. These units affect only the measurements in the Direction Distance grid. More

on this can be found here.



The output grid should be selected by clicking on the desired "node". When available, comments regarding each datum appear in the "Comments" box. The Datums have been organized into "American Projections", "European Projections", "Pacific Projections", and "Universal Projections". These are our designations for simplicity, and carry no other special significance. A complete list of the supported datums is listed here. However here are some simple guidelines:

- UTM_NAD_27, UTM_NAD_83 - these are Universal Transverse Mercator projections based on either the North American Datum 27 or 83. Use these when you know you're trying to match up a specific projection.
- SPCS_27, SPCS_83 - These are the U.S. State Plane Coordinate System, based on either NAD 27 or NAD 83 datums. Note that you must know which State Zone the points on the GPS are in, and select that zone (since the state zones are so irregular, it is virtually impossible to derive them from the Point's Lat/Long). If you don't know the zone, find out before using the program. Note that ALL THE POINTS MUST BE WITHIN THE SAME ZONE! because the coordinate system of each zone is repeated.
- Universal Projection\UTM_NORTH - this is a simple WGS 84 datum for use in the Northern Hemisphere. If you don't have any other special requirements, and the points are in the Northern Hemisphere, try using this. If you're in the Southern hemisphere, choose UTM_SOUTH.

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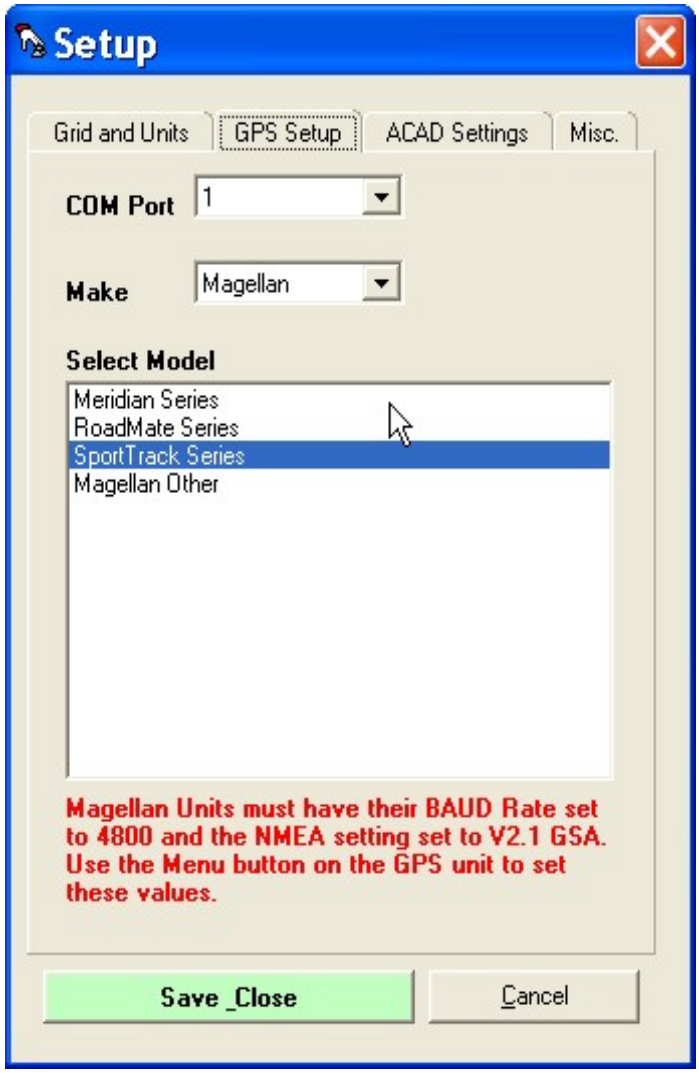
GPS Units

Use this section to provide information needed to connect your GPS unit.

- COM port - select the COM port your GPS unit is connected to. These are typically a Serial port on the back of the computer. USB ports are not supported, but you can obtain 3rd party software that will make your USB port look like a Serial port.
- Make - Choose between Garmin and Magellan.

Magellan units must be set to a baud rate of 4800, and the NMEA string = V2.1 GSA. To do this, use the menu button on the GPS unit to set these values: press Menu\Setup\Baud Rate\4800 Baud and Menu\Setup\NMEA\V 2.1 GSA

- Select Model - Choose the appropriate model. Note that for Garmin, the models themselves are not listed, but the TYPE of SYMBOL LIBRARY is listed. We feel it's just not practical to keep up with all the models available, therefore we have used this method: the older models have a 16 symbol library, the later models have more (it varies). Choose the appropriate model, and if you're not sure, try the Other. Note that this selection only affects how the program assigns a symbol name to the point.



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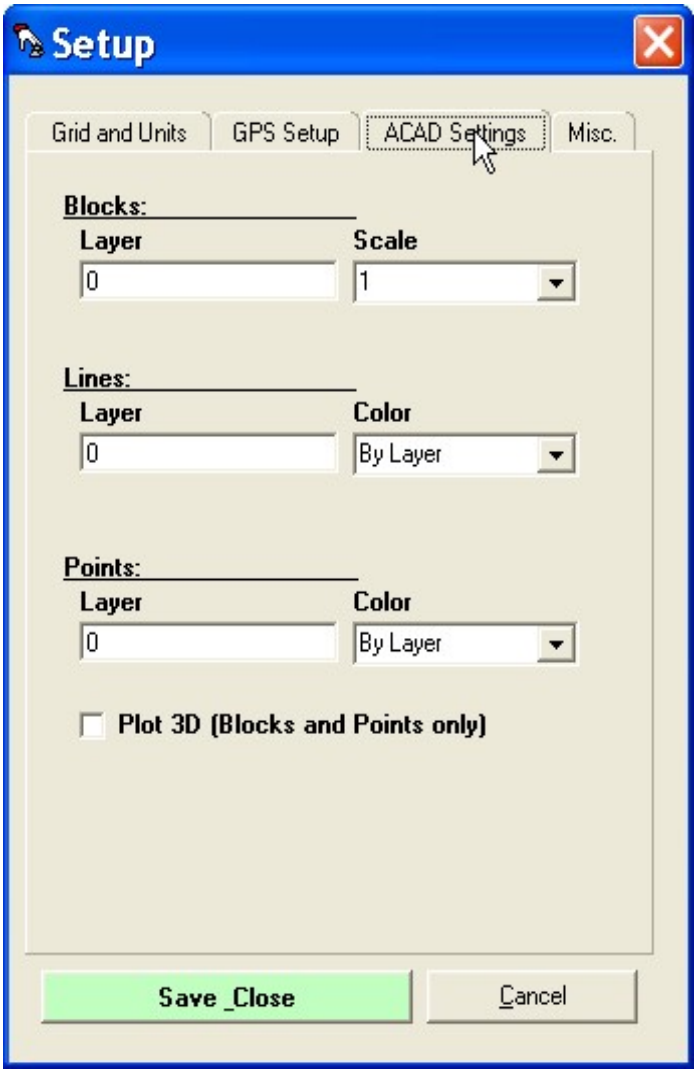
ACAD Settings

This section is used to specify settings used when placing the points, lines, and blocks into AutoCAD. The settings are self explanatory.



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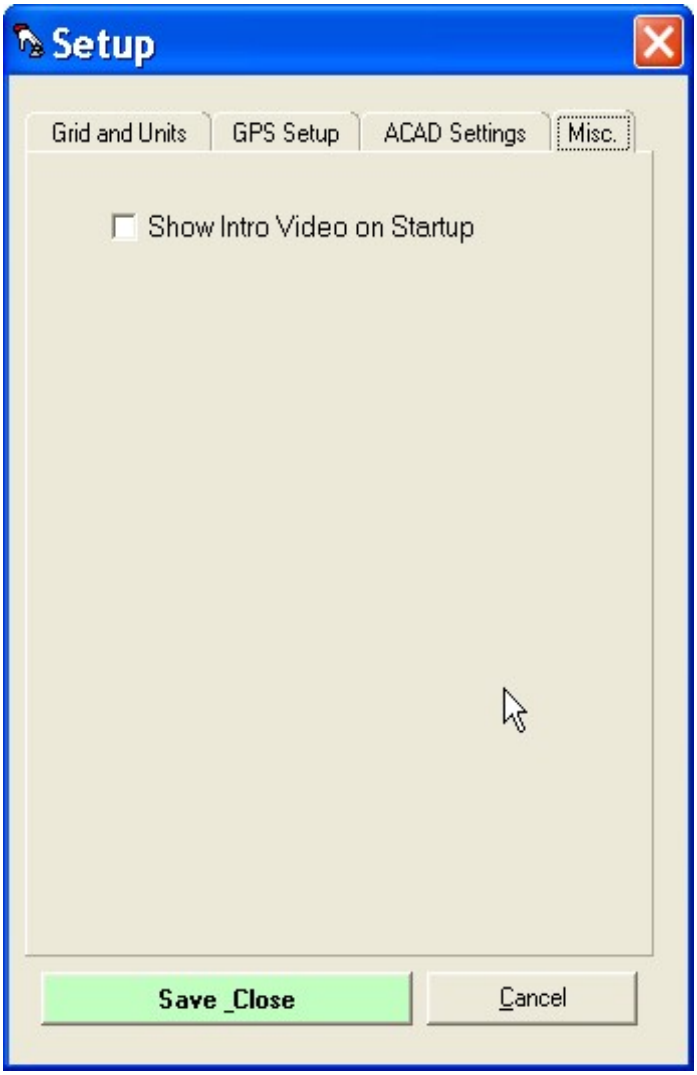
Misc

The Preferences/Misc. tab contains a check box that controls whether the Intro Video is shown on startup.



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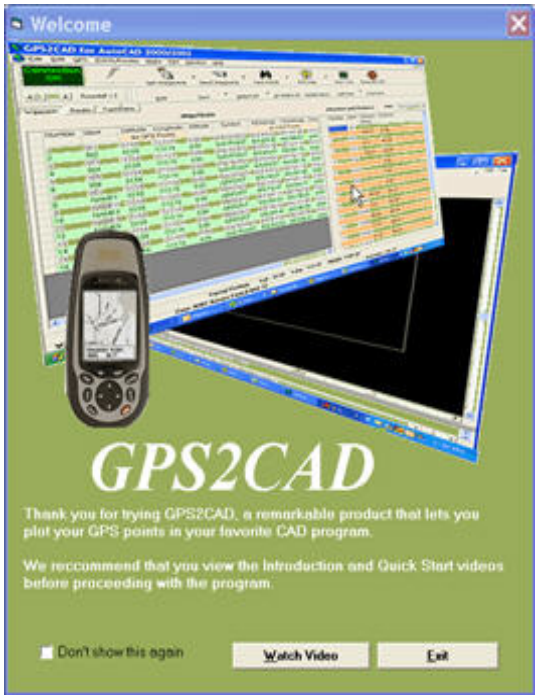
the MAIN PROGRAM

Splash Screen

The splash screen appears on Startup. It contains a link to the Video Help page of the website www.gps2cad.com. We recommend that you take a look through the available help videos on the website. It is an on-going project, so be sure to check back often.


Welcome
GPS2CAD
Thank you for trying GPS2CAD, a remarkable product that lets you plot your GPS points in your favorite CAD program.
We reccommend that you view the Introduction and Quick Start videos before proceeding with the program.
Don't show this again
Watch Video
Exit

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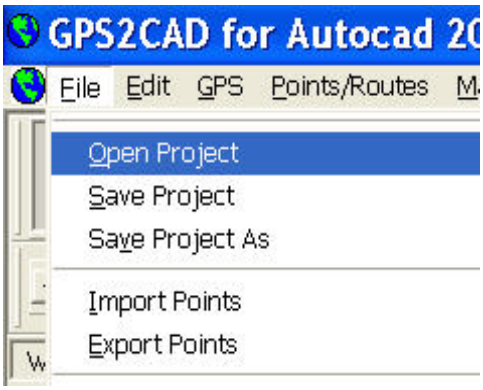
Open/Save Projects

With GPS2CAD you can save projects you are working on, or open a project that you have saved. To do this, go to File/Open Project; File/Save Project, or File/Save Project As.

There is a "most recently used project" list at the bottom of the file menu.

Saving a project saves the points in all the grids, and the preference settings. It does not save the maps that you may have in a map window.



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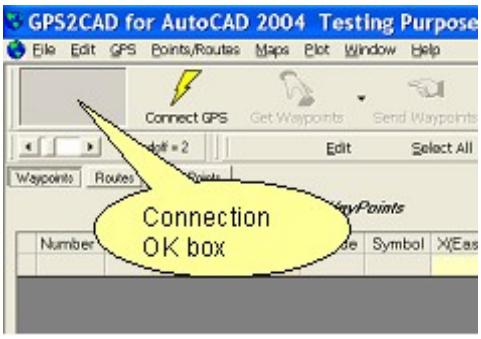
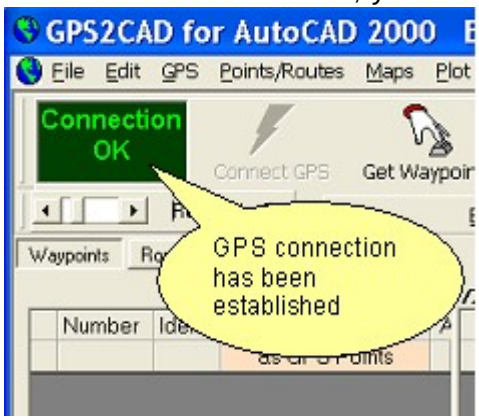
Connecting to GPS

When the program starts, you must first connect to the GPS unit if you are going to retrieve it's points. The "Connection OK" box indicates whether the connection has been made. On program startup it appears as shown:

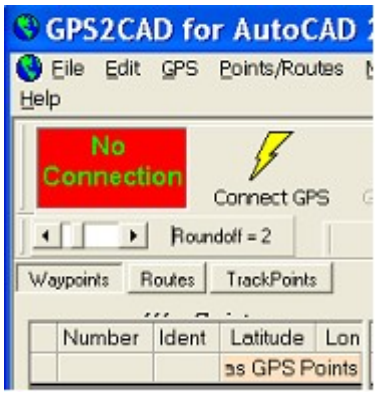


Note that many portions of GPS2CAD are still usable without a GPS connection. This includes adding and viewing your own points, importing and exporting points, connecting to AutoCAD, just about any function that does not require a GPS data or function.

When a connection to the GPS unit has been established, you will see "Connection OK":



If the connection fails, you will see "No Connection:

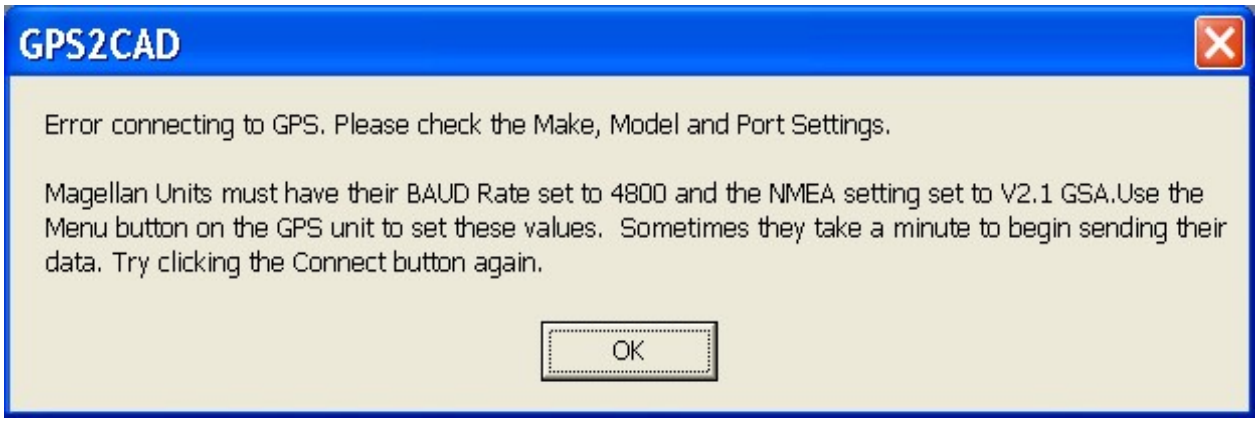


Should this occur, you should click the "Connect GPS" button to establish or re-establish connection to the GPS.

Troubleshooting your GPS connection

Few things can go wrong when connecting to the GPS unit, but on occasion it can become a problem. Here are some guidelines for resolving the connection:

- If you encounter an error while trying to connect, you may receive this error message:


GPS2CAD
Error connecting to GPS. Please check the Make, Model and Port Settings.
Magellan Units must have their BAUD Rate set to 4800 and the NMEA setting set to V2.1 GSA.Use the Menu button on the GPS unit to set these values. Sometimes they take a minute to begin sending their data. Try clicking the Connect button again.
OK

- Magellan units sometimes require a second click shortly after the first to establish a connection (don't ask why...we're working on it!)
- Magellan units must be set to a baud rate of 4800, and the NMEA string = V2.1 GSA. To do this, use the menu button on the GPS unit to set these values: press Menu\Setup\Baud Rate\4800 Baud and Menu\Setup\NMEA\V 2.1 GSA
- Double check the COM port that you have selected in the GPS2CAD Setup window. Make sure it is active and connected to your GPS unit
- Make sure the GPS is turned on. Oddly enough, this is frequently the cause of "No Connection"
- Check that your GPS unit has *fresh batteries*. Generally, low battery power will cause the GPS to turn itself off; so even thought you "know you turned it on..." *it may have turned itself off because of low batteries.*
- Check the output Interface settings of the GPS units. For Garmin, the settings should be:
  Format: Garmin
  Transfer Mode: Host

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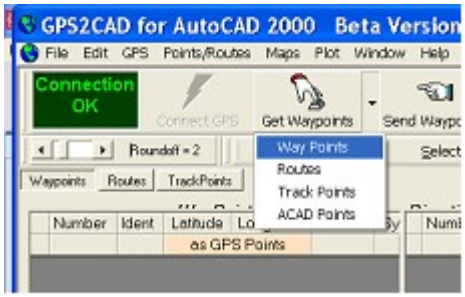
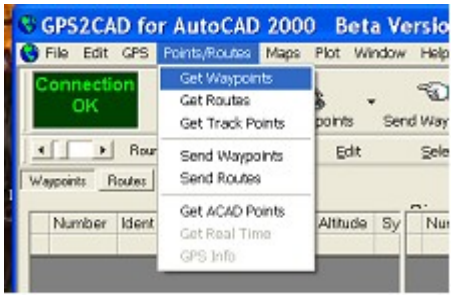
Downloading Points and Routes

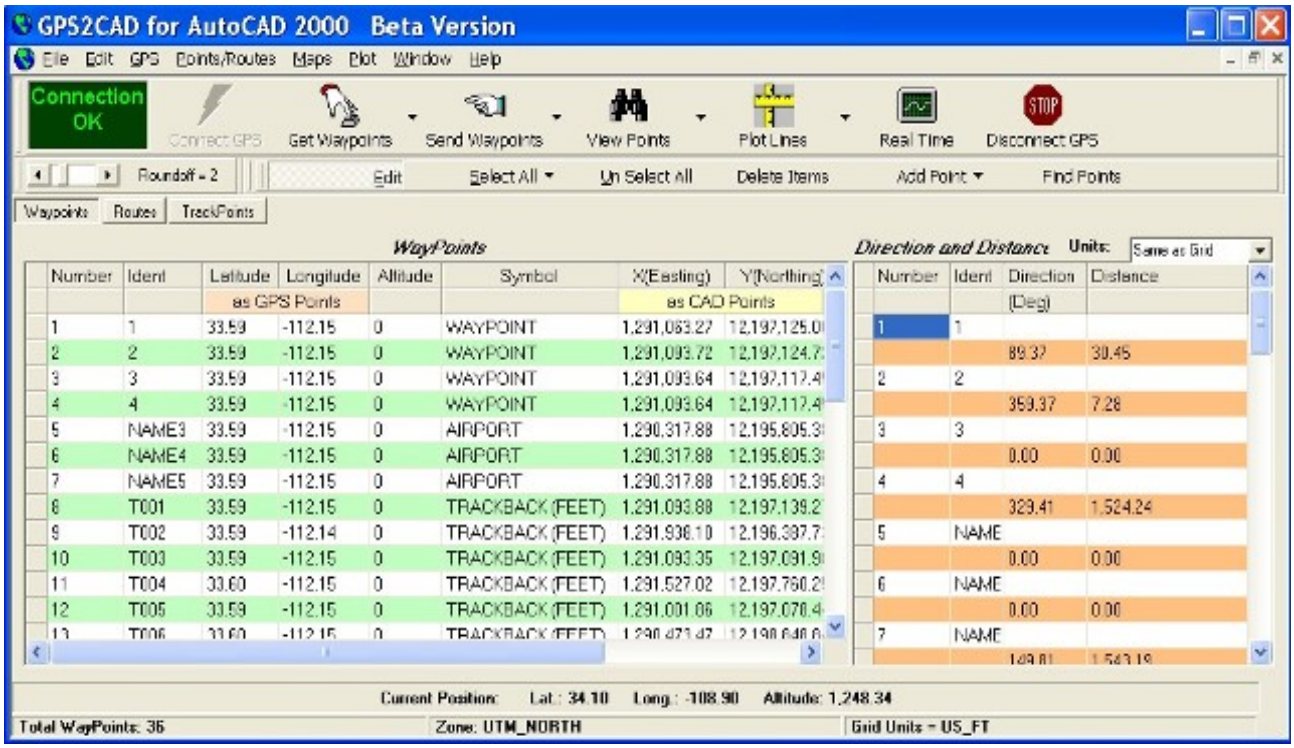
Once the connection is established, downloading points and routes can be done by simply clicking a button. To download the points, you may click on the Toolbar "Get Waypoints" button, or the down arrow that reveal additional choices:



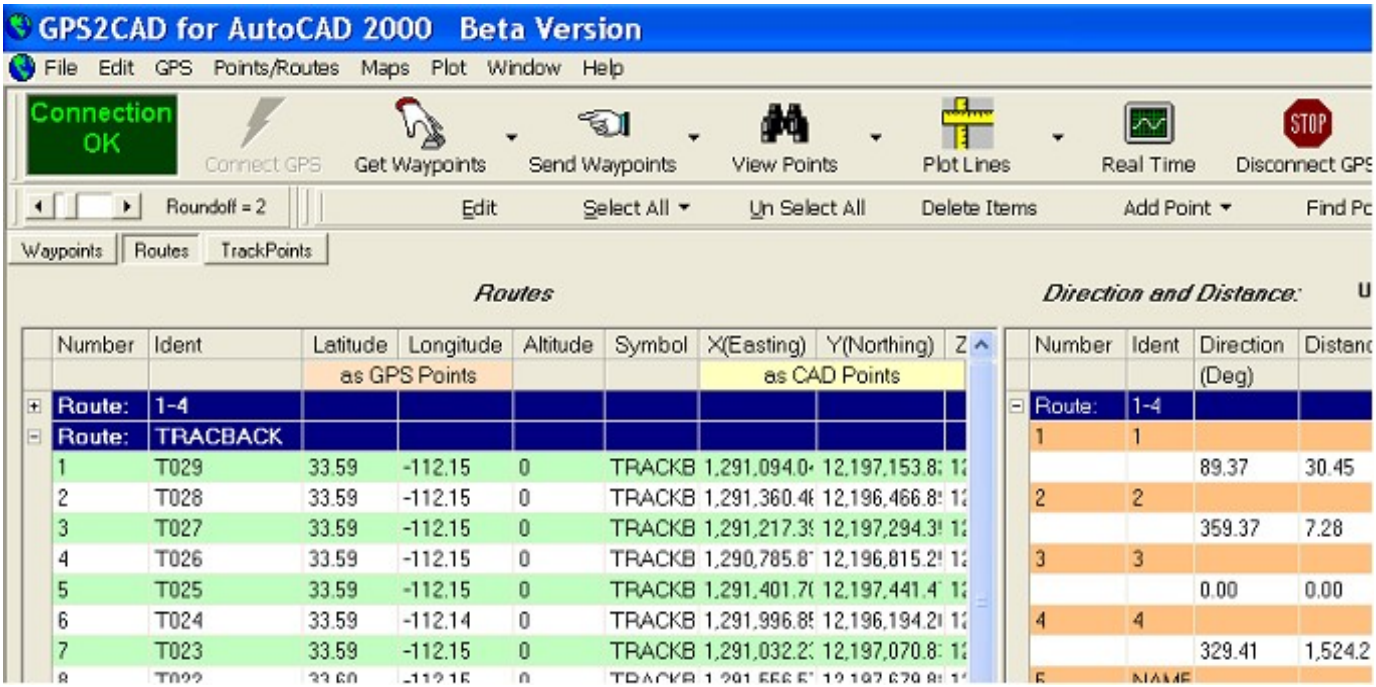


Routes can be downloaded by clicking the Routes on the toolbar or Get Routes from the Drop Down menu. Clicking on "Track Points" or "Get Track Points" similarly will download the Track Points from the GPS Unit. The Track points are those that are automatically recorded by the GPS unit and provide the "bread crumb" track of your location.

Note that there are three grids: one for Waypoints, one for Routes, and one for Track Points. The points are automatically loaded into the proper grid, and you may switch between them by clicking on the Waypoints, Routes, or Track Points button above the grid.



Routes appear in the main Route grid and the Route Direction Distance grid with a "Header" row that contains the route name and a "+" button that allows you to expand/collapse the points in the route:



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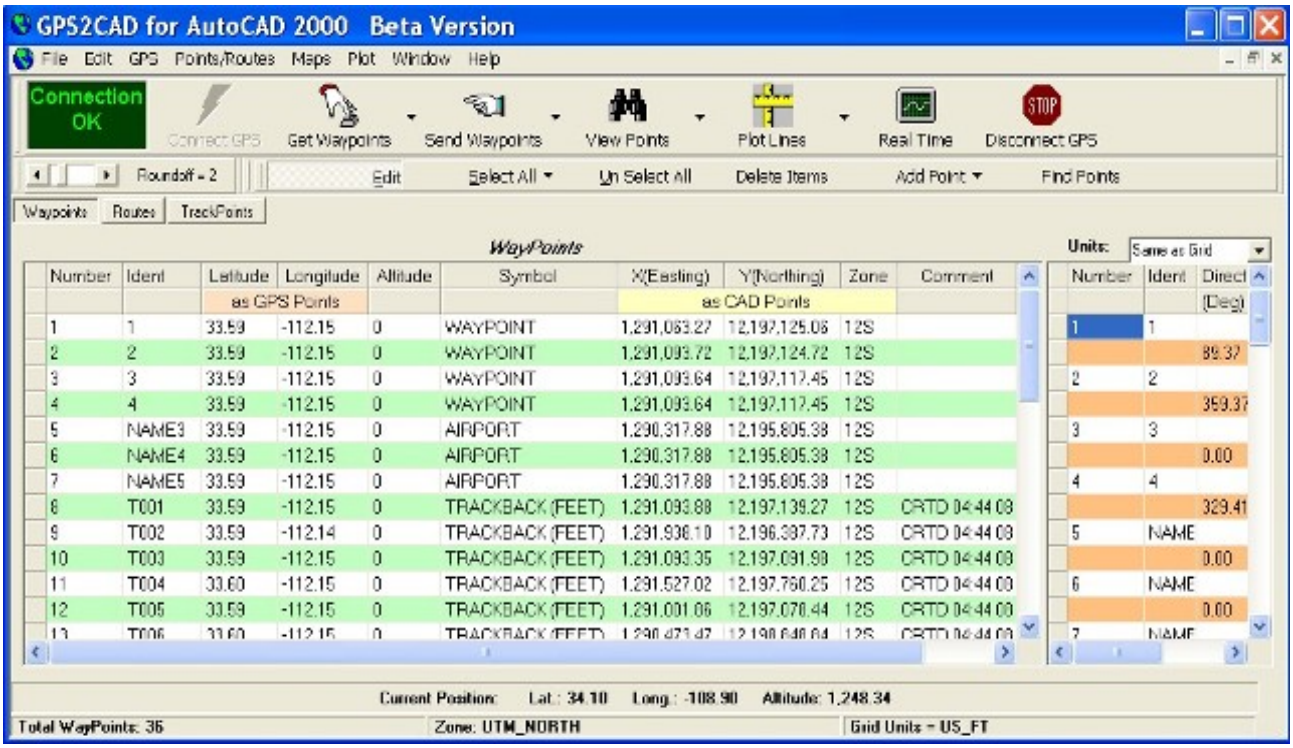
Grid Columns

Some explanation of the information in the Grids is necessary:

Main Grids

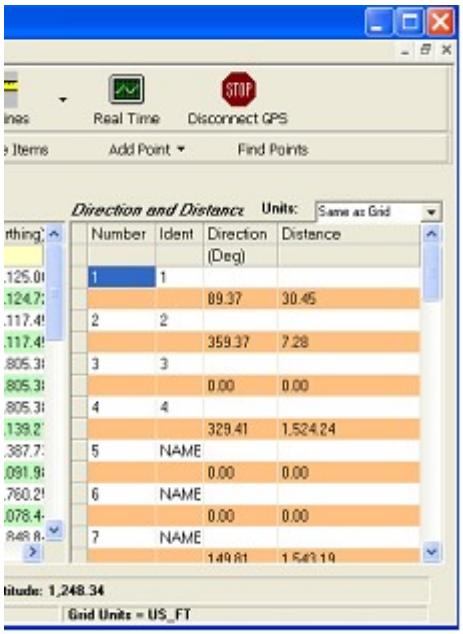
- Number - the values in this column show the consecutive number of the point in the grid. It is not a value that was extracted from the GPS unit. This is not a number you should try to change - it is there simply for referencing the Point in the grid
- Ident - This is the Identifying name or "ID" of the point that was used in the GPS unit. It can be changed/edited as needed.
- Latitude/Longitude, "as GPS Points" - these columns show the coordinates of the point as contained in the GPS database. It is IMPORTANT to understand that in all cases, the GPS units maintain an internal database in WGS 84 datum - the native format designed for satellite/GPS work. Most GPS units will DISPLAY the points in several different datums, but they are maintained internally in WGS 84, and this is the format that is downloaded from the GPS.
- Altitude - if the GPS unit maintains the altitude of the point in it's internal database, it is downloaded and shown here. As with datum projections, most GPS units show the calculated altitude on the screen, but relatively few units maintain the altitude in the database. More about Altitude can be found here
- Symbol - This columns shows a text description of the Symbol number used by that point. Different GPS units have different Symbol libraries, and the correct library is used in this column, based on the Setup selections. You can change the symbol by clicking the Edit button, and then clicking in the Symbol column - a drop-down selection box will appear and you can choose a new symbol. If you are in doubt about the symbol to use, try "Waypoint" as this is like a default for most GPS units.
- X(Easting), Y(Northing), Zone, "as CAD Points" - These columns show the calculated coordinates based on the selected Datum and Units from "Setup".
- Comment - This contains the comment contained in the GPS point database. In many cases, the default comment is a date/time value that the point was entered, or some other default values assigned. Check your users manual for the values that are placed here by default.



Direction Distance Grids

The Direction Distance grids show the information from point to point of those shown in the main grid to it's left.

- Number, Ident - these columns are extracted from the grid to the left, showing the consecutive number of the point and it's given identification
- Direction - the direction is calculated as an azimuth (0 to 360) in Degrees, based on a simple geometric calculation of the Grid coordinates (as CAD Points) of each point. No attempt at showing differences between True North and Magnetic North is made. Note the Units drop down box above the grid. This can vary the Distance value shown in the grid, based on the selected units. More about this is found here.



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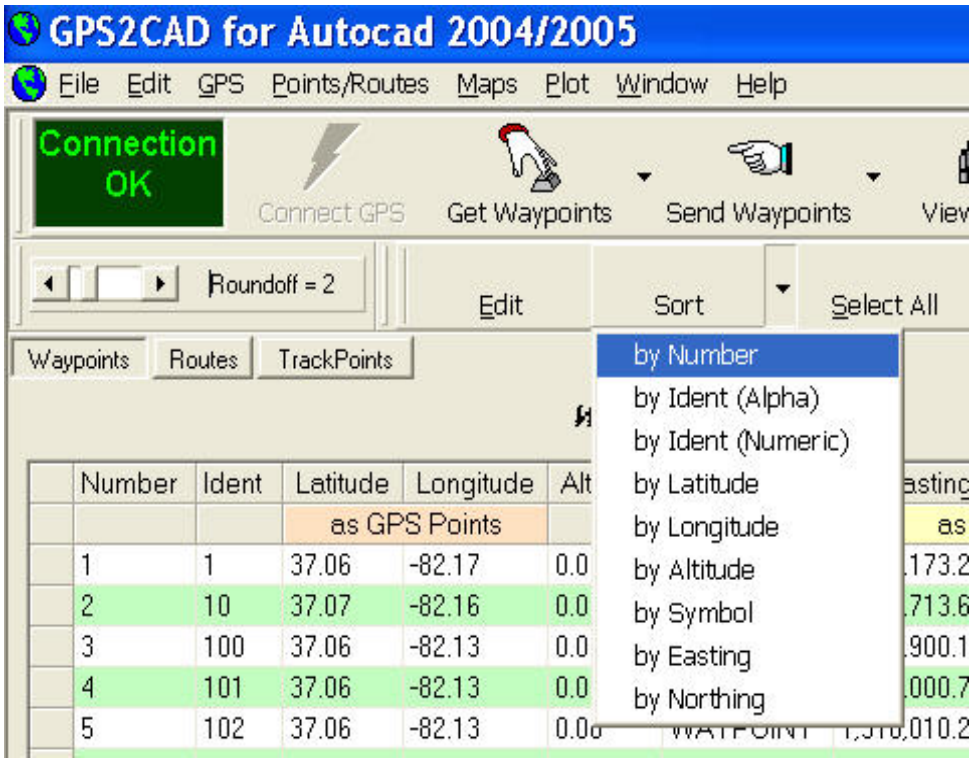
Sorting Points

The Sort button on the main toolbar will sort the points in the Waypoint grid in several ways. The default sort is Numeric by point number. The other options are shown on the button's drop down menu:



Sort by Ident (Alpha) and sort by Ident (Numeric) is provided to overcome the problem of sorting an alpha string as a numeric string. The following illustrates the difference in the sort:

Number	Ident	Latitude	Longitude
		as GPS Points	
1	1	37.06	-82.17
2	10	37.07	-82.16
3	100	37.06	-82.13
4	101	37.06	-82.13
5	102	37.06	-82.13
6	103	37.06	-82.13
7	104	37.06	-82.13

Sort Ident (Alpha) - notice that the points are sorted by the ident column, reading the numbers as alpha characters.

Number	Ident	Latitude	Longitude
		as GPS Points	
1	1	37.06	-82.17
112	2	37.06	-82.17
153	3	37.07	-82.17
164	4	37.07	-82.17
175	5	37.07	-82.17
186	6	37.07	-82.17
197	7	37.07	-82.17
208	8	37.07	-82.17
219	9	37.07	-82.16

Sort Ident (Numeric) - notice that the points are sorted by the ident column, reading the numbers as numeric values.

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Main Window Controls

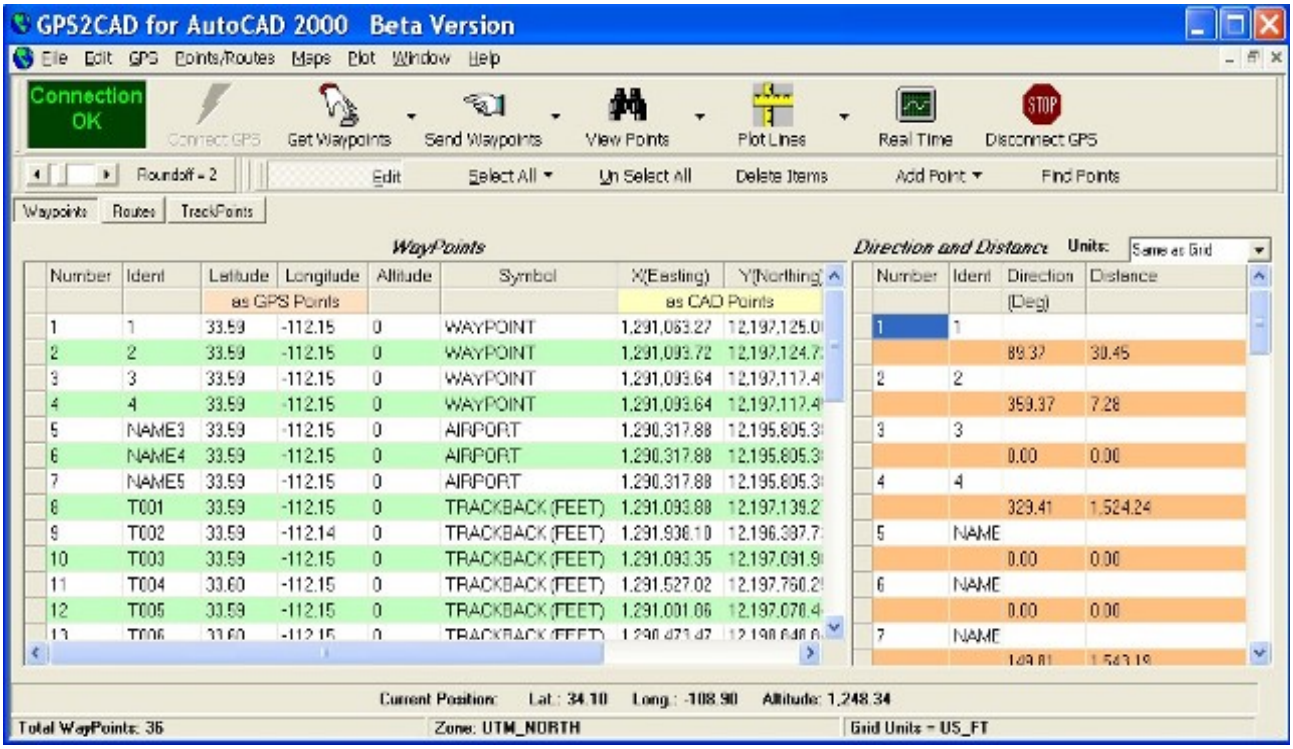
This section provides an overview of the controls on the main window. Where more information is available, it is shown by link.

- Connection OK - shows the status of the GPS connection to the program. More about that here.
- Connect GPS - makes the connection to the GPS. More about that here
- Get Waypoints - this command is the most frequently used of those for downloading points, and is placed as it's own button. It simply downloads the waypoints from the GPS unit. Note the Down Arrow to the right - this provides additional choices:
  * Waypoints - a repeat of the Tool bar button
  * Routes - retrieves the Routes from the GPS unit
  * Track Points retrieves the Tracks from the GPS unit
  * ACAD Points - retrieves points from the ACAD drawing and places them in the grid, to be used for viewing or upload to the GPS
- Send Waypoints - Sends the Waypoints to the GPS unit. It also has a drop down menu that includes:
  * Send Waypoints - a repeat of the Tool Bar button
  * Send Routes - sends the routes to the GPS unit

  Note that Tracks may not be uploaded to the GPS unit
- View Points - This tool bar button places the SELECTED points on an Aerial Photo for viewing. The aerial photo is obtained automatically from TerraServer - USA, and you must have an active Internet Connection for this feature to work. The Drop down menu allows these choices:
  * Preview - Places the selected points on a Preview map, showing a simple line drawing
  * Aerial - a repeat of the View Points button, shows the points on an Aerial Photo
  * Topo - Places the selected points on a Topographic map from TerraServer-USA
  *Tiger - Places the selected point on a public domain Tiger map (also known as a Census Map). Note that only one point at a time can be shown on this map.

- Plot Lines - Plots the selected points as a light weight polyline in AutoCAD. The Drop down menu allows these choices:
  * Plot Lines - a repeat of the toolbar button
  * Plot Points - plots the points as an AutoCAD Point (Node). Be sure to reset the AutoCAD variables PDMode and PDSize to something that is visible!
  * Plot Blocks - inserts a block with attributes showing most of the data in the grid.
- Real Time - brings up the Real Time Capture window
- Disconnect GPS - Disconnects the GPS unit from the program. It is not generally necessary to do this, and an orderly disconnect is done when you end the program. However it is sometimes helpful to connect/disconnect/reconnect, and it is provided for this reason.
- Round off - selects the number of decimal places the numbers in the grid are shown to. It affects only the displayed numbers - internally they are maintained to their full accuracy.
- Edit - when depressed, enables editing of the values in the main grids
- Sort - sorts the points in the grid. See "Sorting Points"
- Select All - selects all the points in the CURRENT grid (the visible grid) for a subsequent operation. The drop down menu allows for selecting
  *All (a repeat of the toolbar button)
  * every 2nd, every 3rd, every 5th, or every 10th point in the grid
- Unselect All - de-selects all the points in the CURRENT grid
- Delete Items - Deletes all the Selected items from the CURRENT grid
- Add Points - Brings up the Add Points window

- Find Points - Brings up the Find Points window
- Waypoints/Routes/TrackPoints tabs - displays the respective grid. Note that all of these can be populated at one time, and you can click between them for viewing
- Current Position Label - shows the current position being read from the GPS unit screen/real time information (not the database)
- Total Waypoints - shows the total waypoints in the Current Grid
- Datum - Shows the current Datum and Zone (if applicable) that has been selected in Setup
- Grid Units - Shows the current Grid Units that were selected in Setup



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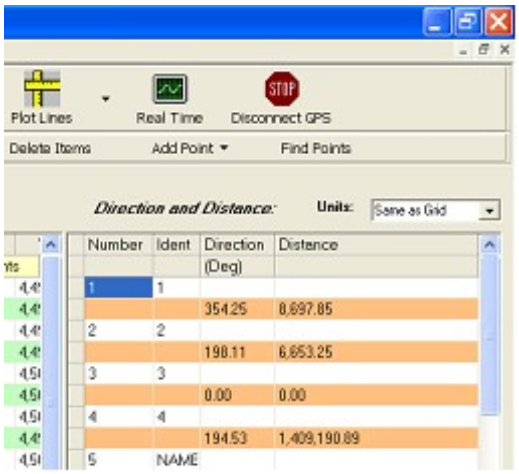
Direction Distance Grid

The Direction - Distance grid shows the Azimuth in Degrees and distance of each leg, referencing the point grid to it's left. The Number and Ident columns provide the consecutive point number and the identifying name, while the Direction and distance between that point and the next is shown in the next two columns.



The "Units" drop down box requires some explanation. The units refer to the Distance units *shown in the Direction Distance Grid*. The Point grid may reflect the CAD coordinates in one of four units: Meters, International Foot, U.S. Foot, and Ireland Foot, and these are selected in the Preferences section. Each of these selections is converted to the desired Distance unit in the Direction Distance grid. For example, if you chose Metric units for the grid in Setup, the correct factor is applied for the conversion into the distance units selected. The units have been organized for convenience into "American Units",

- Same as Grid - uses the same distance units as the grid is set to. This is simply a convenience to quickly select the same as the grid
- American Units - all based on 1 Meter = 39.37 inches
- US_FOOT = (1200/3937) Meters
- Rod = .25 chains
- Link = .01 chains
- Chain = 66 US Feet = 20.11684 Meters
- Meters = base standard used
- Kilometers 1000 X Meters
- International Foot = .3048 Meters
- Yard = 0.9144 Meters
- Statute Mile = 1609.344 Meters
- British Nautical Mile = 1853.184 Meters
- International Nautical Mile = 1852 Meters
- Irish Foot = .3048007491 Meters

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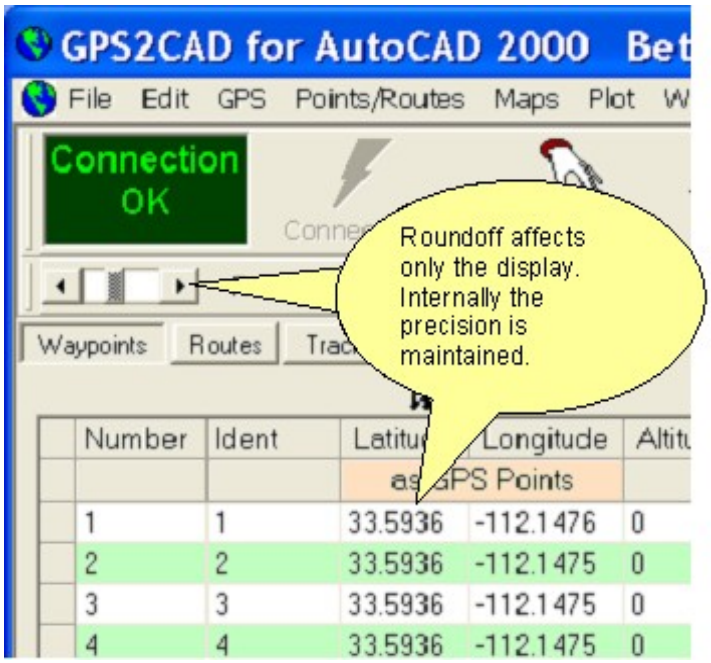
Round-off

Since not all projects require the same degree of accuracy, it is possible to select the amount of precision that the numbers are displayed with by selecting the number of decimal points on the horizontal slider bar above the Grid tab. It's important to understand that the program *maintains the full precision of the number internally* for all the calculations.


GPS2CAD for AutoCAD 2000 Bet
File Edit GPS Points/Routes Maps Plot W
Connection OK
Roundoff affects only the display. Internally the precision is maintained.
Waypoints Routes
Number Ident Latitu Longitude Altitu
as GPS Points
1 1 33.5936 -112.1476 0
2 2 33.5936 -112.1475 0
3 3 33.5936 -112.1475 0
4 4 33.5936 -112.1475 0

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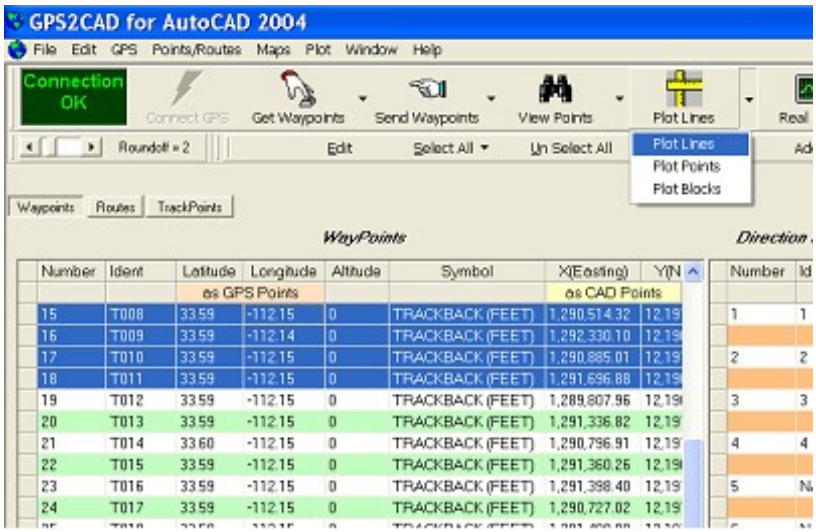
Working with AutoCAD

Sending Points TO AutoCAD

Sending points to AutoCAD is a simple process:

- Verify the AutoCAD settings in Setup
- Select the points to plot. These may be Waypoints, Route points or Track points. DO NOT select a Route Header.
- Start AutoCAD and begin a drawing. (it does not have to be a blank drawing - it can be an existing drawing).
- Return to GPS2CAD and click Plot Lines or one of the Menu items: Plot Lines, Plot Points, or Plot Blocks
- Return to AutoCAD to view the items


GPS2CAD for AutoCAD 2004
File Edit GPS Points/Routes Maps Plot Window Help
Connection OK
Get Waypoints Send Waypoints View Points Plot Lines
Plot Lines
Plot Points
Plot Blocks
Waypoints Routes TrackPoints
WayPoints
Number Ident Latitude Longitude Altitude Symbol X(Easting)
as GPS Points
as CAD Points
15 T008 33.59 -112.15 0 TRACKBACK (FEET) 1,290,514.32
16 T009 33.59 -112.14 0 TRACKBACK (FEET) 1,292,330.10
17 T010 33.59 -112.15 0 TRACKBACK (FEET) 1,290,885.01
18 T011 33.59 -112.15 0 TRACKBACK (FEET) 1,291,696.88
19 T012 33.59 -112.15 0 TRACKBACK (FEET) 1,289,807.96
20 T013 33.59 -112.15 0 TRACKBACK (FEET) 1,291,336.82
21 T014 33.60 -112.15 0 TRACKBACK (FEET) 1,290,796.91
22 T015 33.59 -112.15 0 TRACKBACK (FEET) 1,291,360.26
23 T016 33.59 -112.15 0 TRACKBACK (FEET) 1,291,398.40
24 T017 33.59 -112.15 0 TRACKBACK (FEET) 1,290,727.02

A few notes about the items plotted:

- Lines are not plotted in 3D. Points and blocks may be plotted in 3D depending on the setting in preferences. Default is 3D
- Plot Lines - This plots an AutoCAD Lightweight Polyline. Note that this is different than the "Real Time" plotting, which uses regular lines. Lightweight polylines do not have an elevation attribute for each vertex - that's why they're "Lightweight", and also why they are not inserted in "3D".
- Plot Points - plots an AutoCAD Point (also known as nodes). MAKE SURE you have your AutoCAD settings so the points are visible. If you're not sure, set PDMode = 32 to display points as a Circle, and set the PDSIZE = something greater than zero. These can be set from the ACAD command line by typing PDMODE, enter or PDSIZE, enter
- Plot Blocks - this uses a block with Attributes to display the point information shown in the Grid. Blocks take a long time to plot, and add a lot of clutter to the drawing, so use them sparingly

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Getting Points from AutoCAD

See the section Uploading Points FROM AutoCAD

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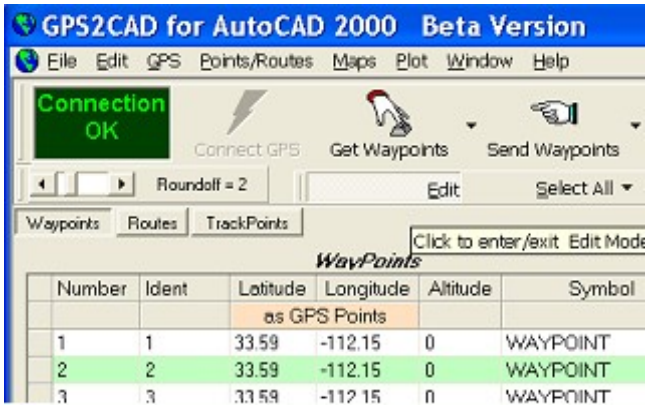
Points and Routes

Editing Points and Routes

The Point information in the main grids can be edited. However during normal use, they are locked to prevent accidental changes. In order to Edit the points, you must click the "Edit" button. This will enable the main grids to be edited, and it will remain this way until the button is clicked again.

When editing, most of the information can be changed. If the coordinates are changed, the corresponding coordinate calculations are made and shown (as GPS Points/as CAD Points). If you upload to the GPS, the changed points will be used. However it depends on the GPS unit as to how it will handle points that it thinks are duplicates - some will overwrite, some will add as new. Be careful when uploading possibly duplicate points!



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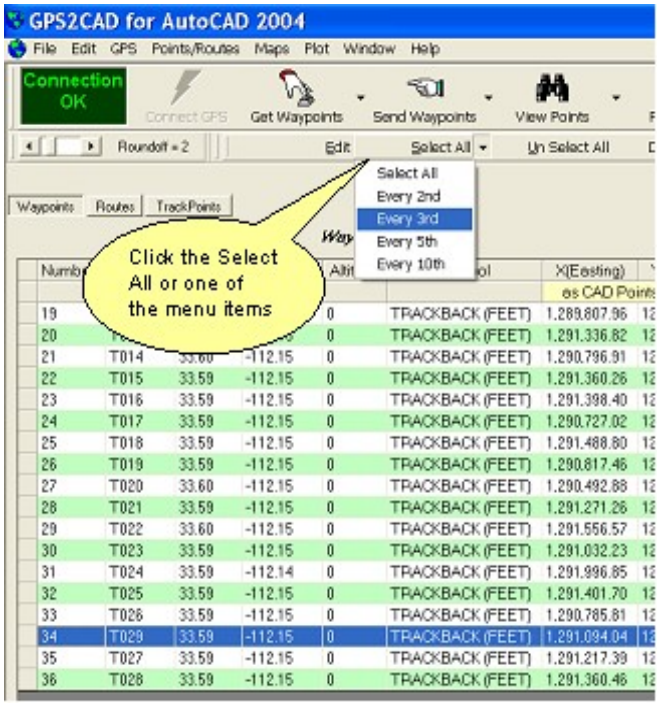
Selecting and Unselecting Points

Selecting points for Editing can be done in several ways:

- Click and drag to highlight the points
- Press the Select All button (or drop down menu item Edit...) to highlight all the points
- Press "Every nth" to select every 2nd/3rd/5th/10th row in the active grid. This is especially useful if the points are close together (such as a track log) and you don't need all of them. Once selected, you may delete them to reduce the total points, or view them to get a clearer picture.


GPS2CAD for AutoCAD 2004
File Edit GPS Points/Routes Maps Plot Window Help
Connection OK
Connect GPS
Get Waypoints
Send Waypoints
View Points
Roundoff = 2
Edit
Select All
Un Select All
Select All
Every 2nd
Every 3rd
Every 5th
Every 10th
Waypoints
Routes
TrackPoints
Click the Select All or one of the menu items
X(Easting)
as CAD Points
19 0 TRACKBACK (FEET) 1,289,807.96
20 0 TRACKBACK (FEET) 1,291,336.82
21 T014 -112.15 0 TRACKBACK (FEET) 1,290,796.91
22 T015 33.59 -112.15 0 TRACKBACK (FEET) 1,291,360.26
23 T016 33.59 -112.15 0 TRACKBACK (FEET) 1,291,398.40
24 T017 33.59 -112.15 0 TRACKBACK (FEET) 1,290,727.02
25 T018 33.59 -112.15 0 TRACKBACK (FEET) 1,291,488.80
26 T019 33.59 -112.15 0 TRACKBACK (FEET) 1,290,817.46
27 T020 33.60 -112.15 0 TRACKBACK (FEET) 1,290,492.88
28 T021 33.59 -112.15 0 TRACKBACK (FEET) 1,291,271.26
29 T022 33.60 -112.15 0 TRACKBACK (FEET) 1,291,556.57
30 T023 33.59 -112.15 0 TRACKBACK (FEET) 1,291,032.23
31 T024 33.59 -112.14 0 TRACKBACK (FEET) 1,291,996.85
32 T025 33.59 -112.15 0 TRACKBACK (FEET) 1,291,401.70
33 T026 33.59 -112.15 0 TRACKBACK (FEET) 1,290,785.81
34 T029 33.59 -112.15 0 TRACKBACK (FEET) 1,291,094.04
35 T027 33.59 -112.15 0 TRACKBACK (FEET) 1,291,217.39
36 T028 33.59 -112.15 0 TRACKBACK (FEET) 1,291,360.46

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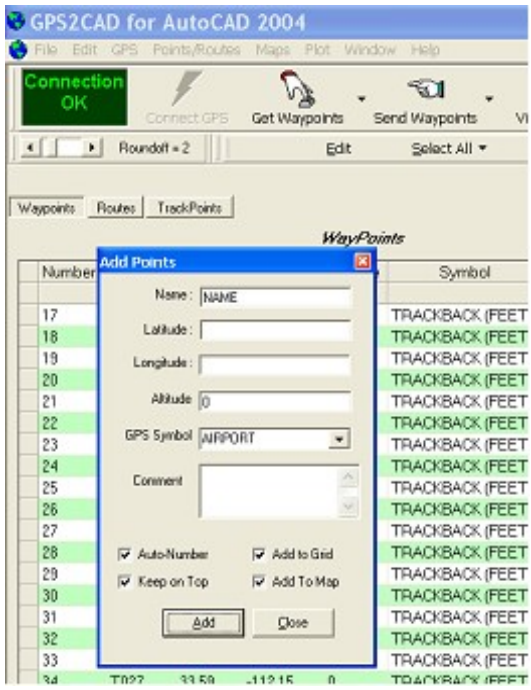
Adding / Deleting Points and Routes

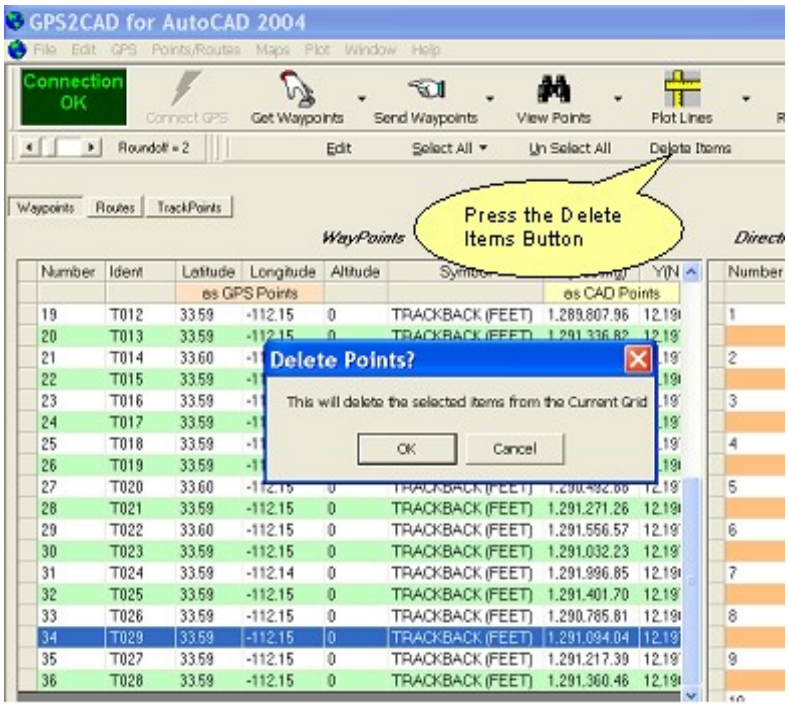
Adding Points and Routes:

Points and Routes can be added to the Waypoint, Route, and Track point grids. In order to add points, click the Add Point button on the toolbar. The Add Point window will appear and you can fill in the desired information. Press OK to insert the point. The point will be inserted at the end of the grid. If you then want to move it to another row, you can Edit - right click - and drag to the new location (see Moving Points)



Deleting Points and Routes:

To delete an item, first select (see Selecting...) then press the Delete Items button



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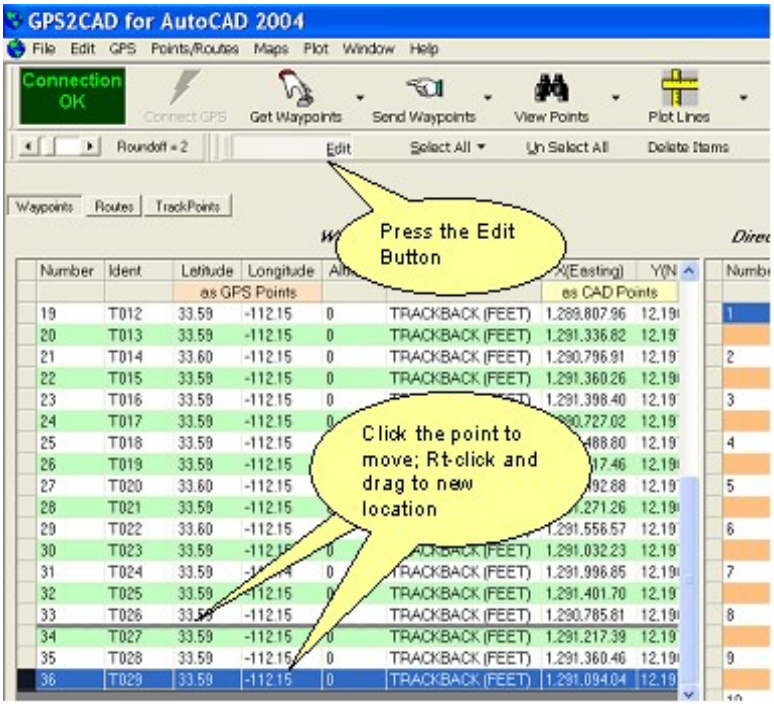
Moving Points in the grid

Points may be moved to a new location in the grid by following this procedure:

- Click the Edit button and make sure it is depressed
- Highlight the point to move by clicking it's row\

- Right - click the highlighted row, and while holding down the right-click, drag the point to a new location. A thick indicator bar will show the new location
- Release the right-click at the desired location
- Click the Edit button to prevent editing

Note that the points will be renumbered consecutively



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Maps

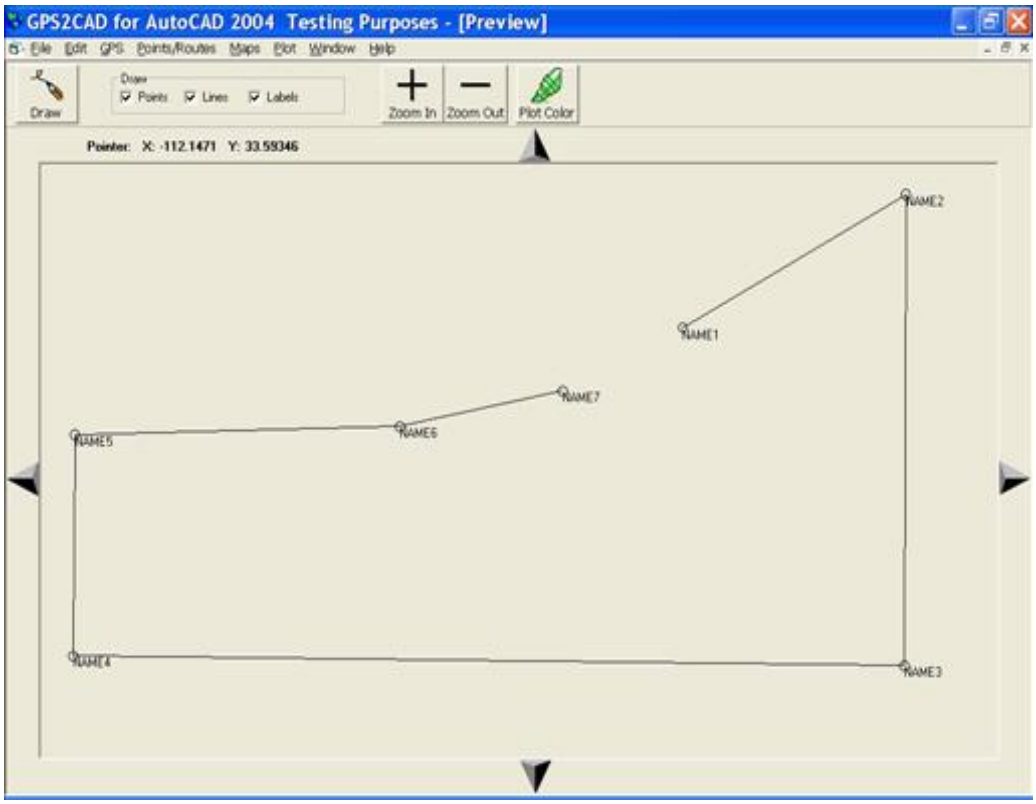
Sample Maps

Four types of maps are available in GPS2CAD:

Preview

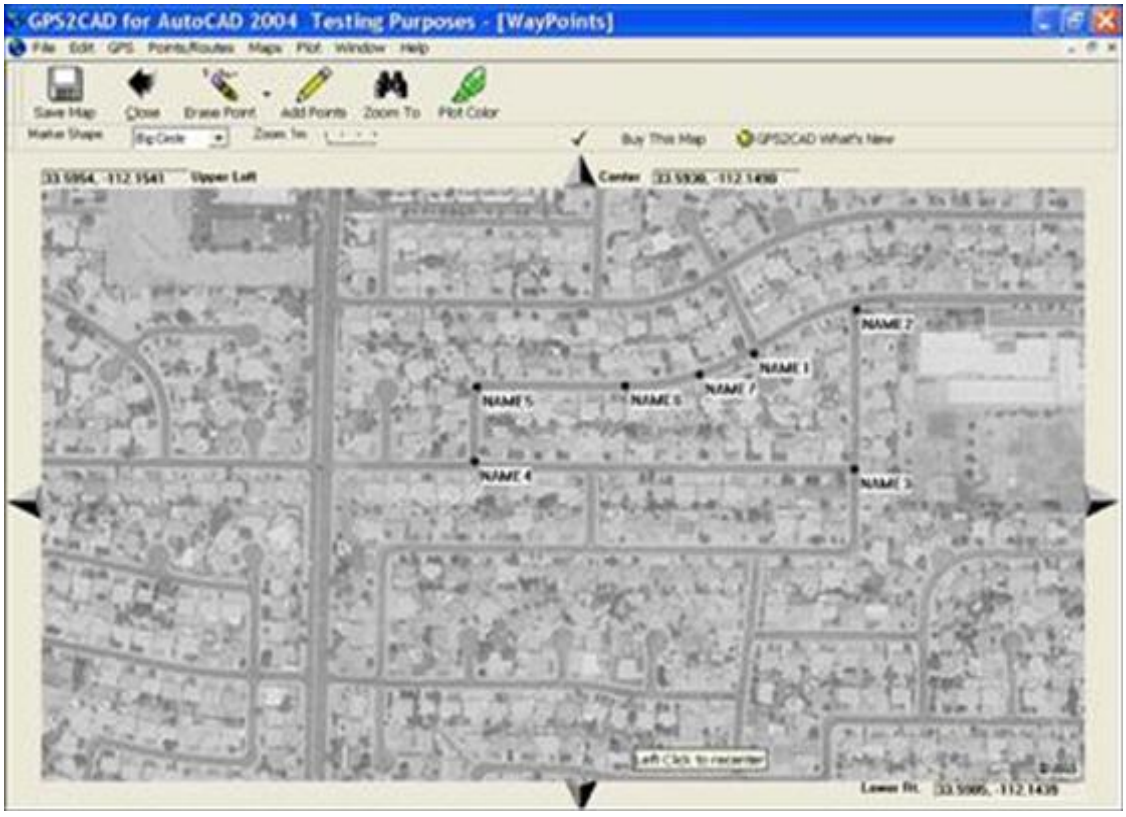
The preview map is provide for the convenience of seeing the selected points as a simple line-plot with labels. It is generated within GPS2CAD and does not rely on AutoCAD. More on using the Preview map can be found here.

The following is a sample of a Preview Map:

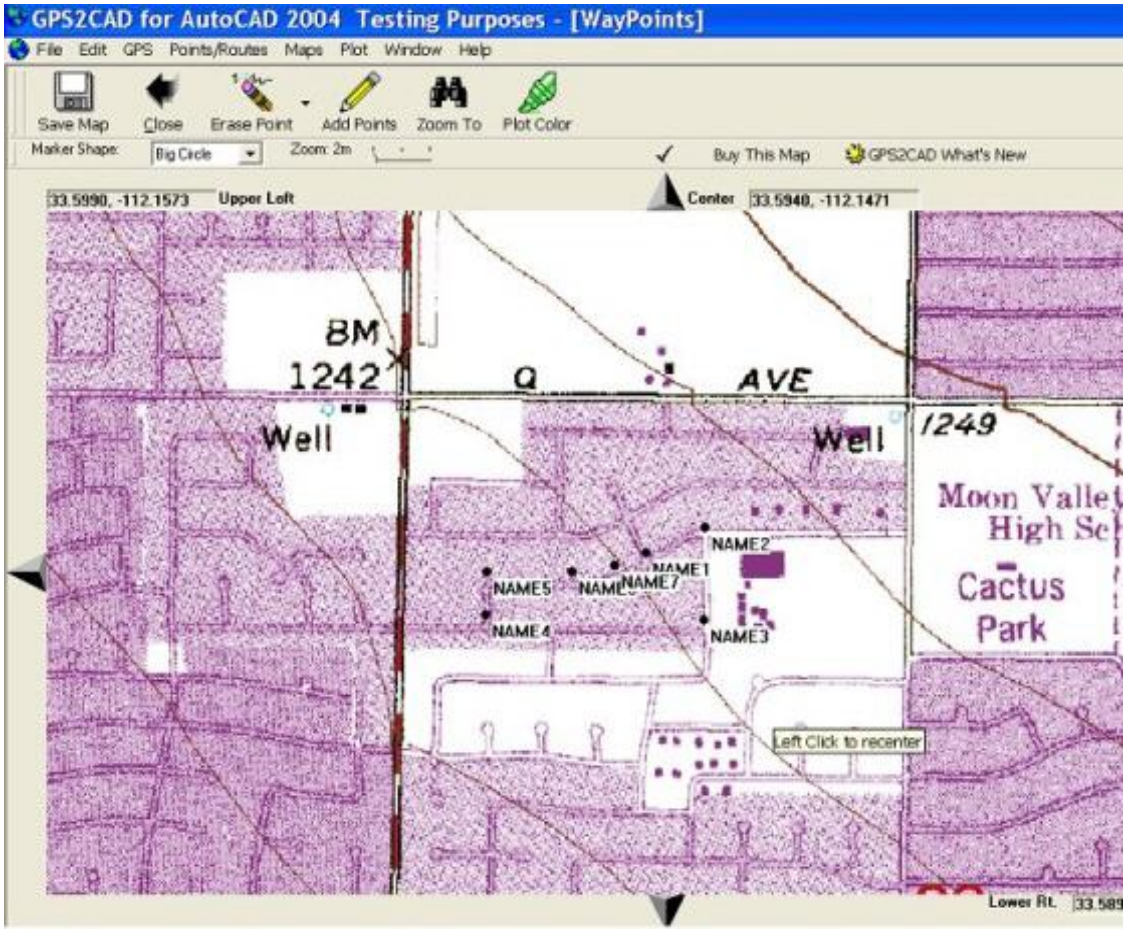


Aerial Photos and Topo Maps - these are obtained from the TerraServer-USA website, which provides public domain mapping of the United States and selected territories. For the most part it does not provide images outside the U.S.

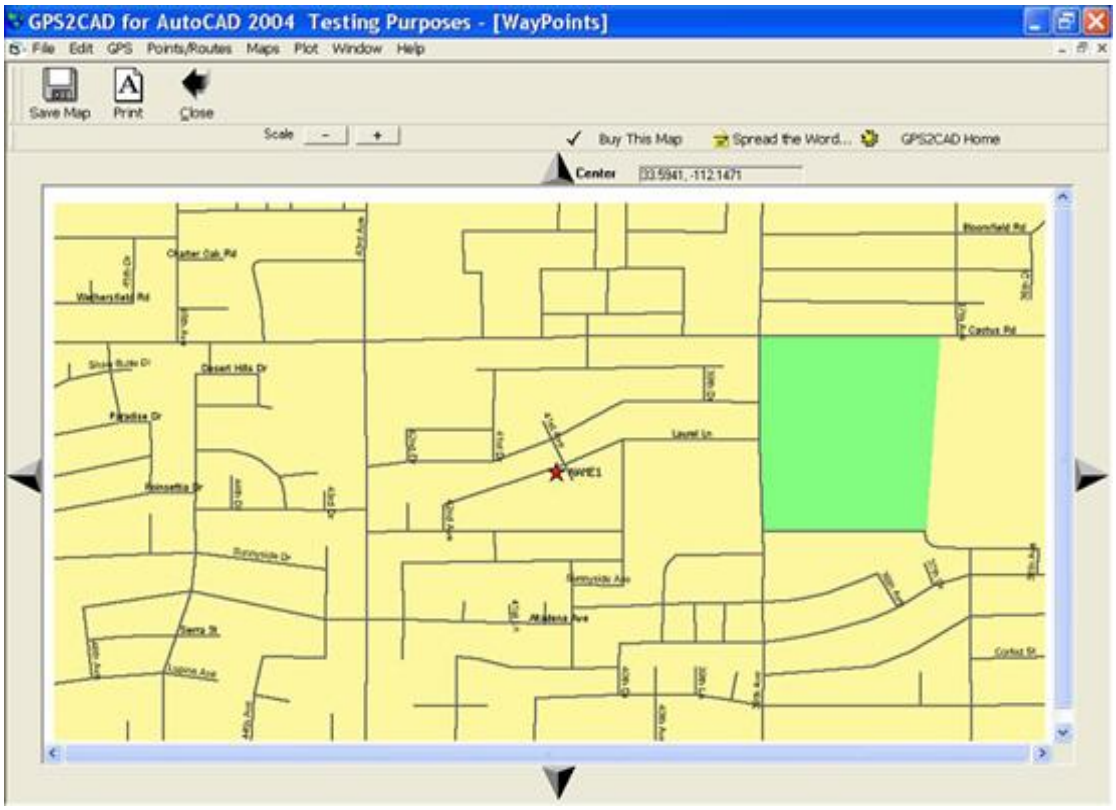
Aerial Photo:



Topo Maps:



Tiger Maps (also known as Census Maps) are obtained from another public domain site. Because of the restrictions of this kind of display, only one point at a time can be displayed. However it is more flexible with display Scale, allowing more choices than the aerial and topo maps.



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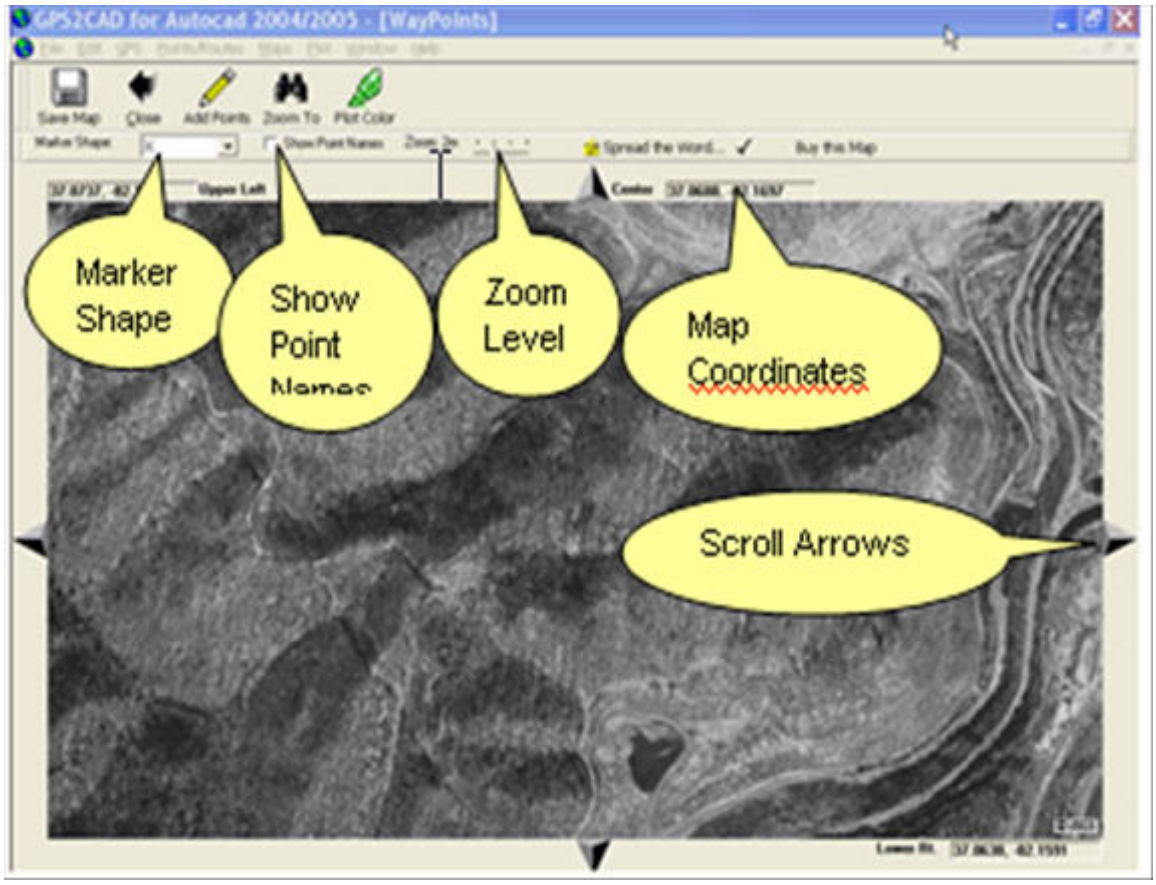
Map Window Controls

The map windows have their own toolbars and controls:

- Save Map - brings up a dialog box that saves the current map as a bitmap file. In case you're wondering about sending the map into AutoCAD, click here
- Close - closes the window
- Add Points - brings up the Add Points dialog window
- Zoom To - brings up the Zoom to Point dialog window
- Plot Color - brings up a color dialog box that lets you select the color to plot the point symbol in
- Marker Shape - selects the marker shape to use when plotting the points on the map
- "Zoom" slider bar - adjusts the map scale that is retrieved from the TerraServer - USA site that supplies the map. For more information on how this works, click here
- Show Point Names - Sometimes the names of the points can become cluttered. This check box turns off the names and leaves the marker. To reduce the clutter even more, choose a dot as a marker
- Scroll Arrows - let you scroll the map to a new location.
- Buy this Map - takes you to our website so you can purchase the map shown in one of many different formats (paper, digital, DEM, etc.)
- GPS2CAD What's New - takes you to our web page that keeps you posted on new features and revisions to the program



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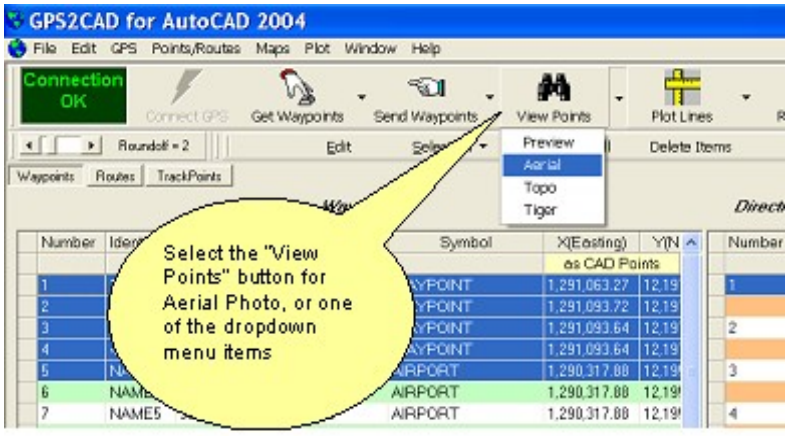
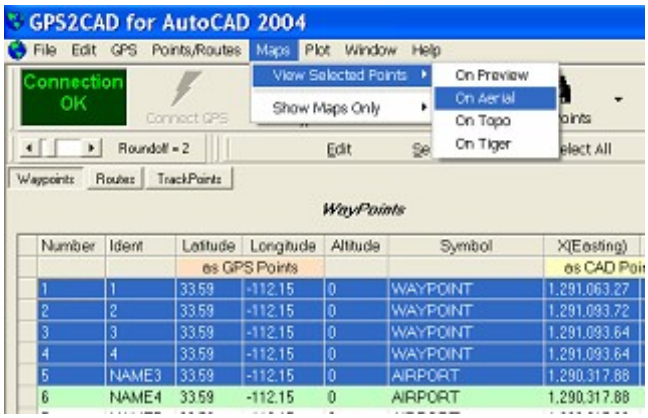
Viewing Selected Points

In order to view the points on an Aerial Photo or Topo map, follow this procedure:

- Select the points to view in any one of the main Grids (Waypoints, Routes, or Trackpoints). They can be selected by clicking or by using one of the select points options
- Select the View Points option to go to an Aerial Photo, or one of the drop down menu items:



- You can also select from the Maps drop down menu:



An important Note about viewing the points - If all the points selected exceed the Lat/Long scale of the map, they will not all be shown. In this case you will have to scroll, change scale, or use the "Zoom to" feature to view them.

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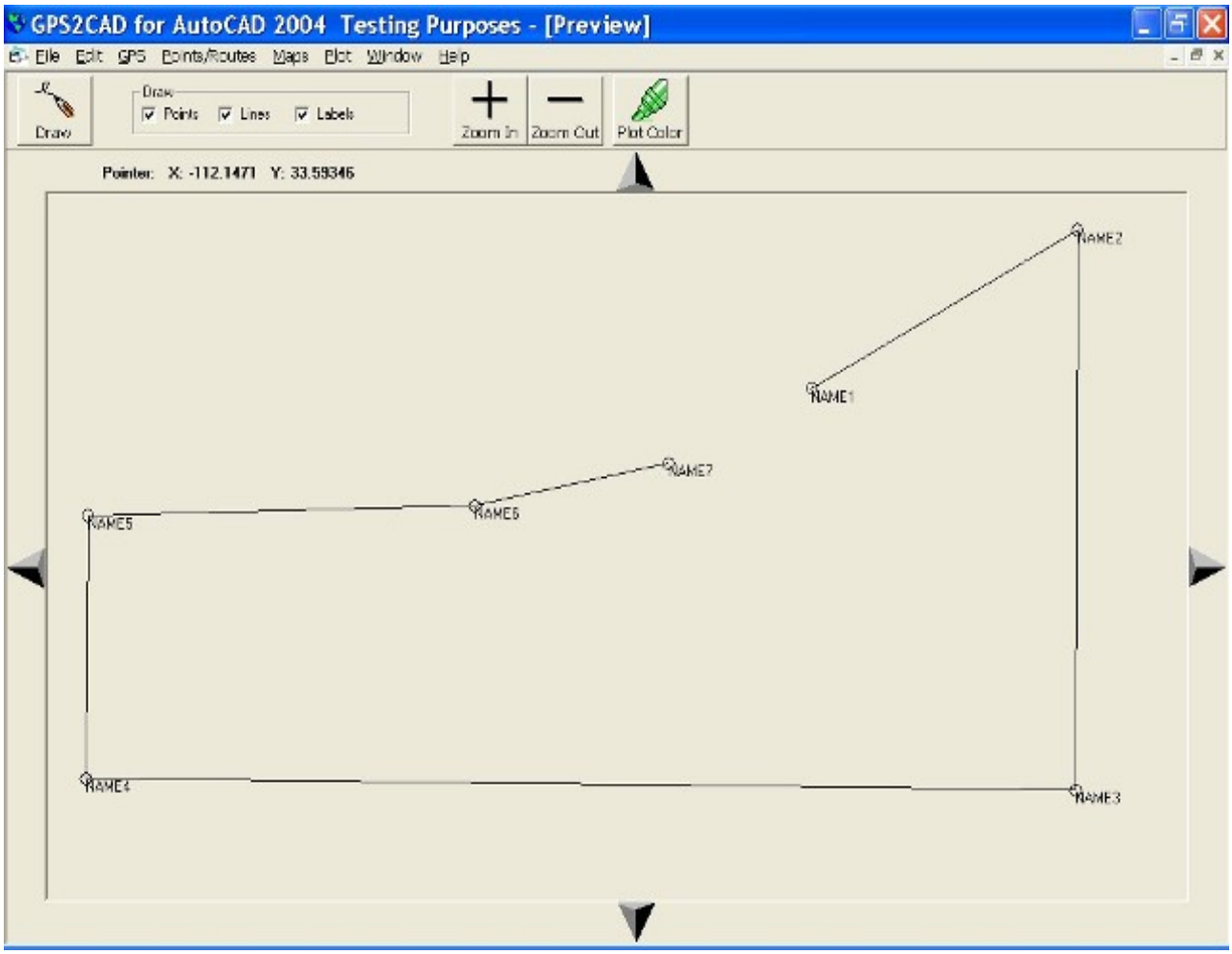
Using the Preview Map

The Preview Map shows a simple line plot with labels of the selected points, and allows you to view the overall context of the points. Unlike the aerial photo and topo maps, the preview map is scaled so all of the selected points are shown, thereby providing a useful "Thumbnail" plot of the points.

To use the Preview Map, first select the points from the desired grid, then click Preview from the toolbar or main menu. The preview map will appear with the points plotted.

The form contains only a few controls:

- Draw - forces a re-draw of the Selected points. This is useful if you go back to the main grid and select additional points, without closing the Preview window
- Draw Points/Lines/Labels - selects the items to draw on the maps. Labels refer to the Ident column of the main grid. Checking/unchecking causes an immediate redraw of the items.
- Zoom In/ Zoom Out - rescales the map appropriately. The points are initially drawn with the scale set to show all of them. Zooming allows you to examine certain areas.
- Plot Color - changes the plotting color for the items
- Pointer Label - shows the current Lat/Long coordinates of the cursor arrow as it moves over the plot area
- Scroll arrows - moves the map in the direction indicated, and replots the points



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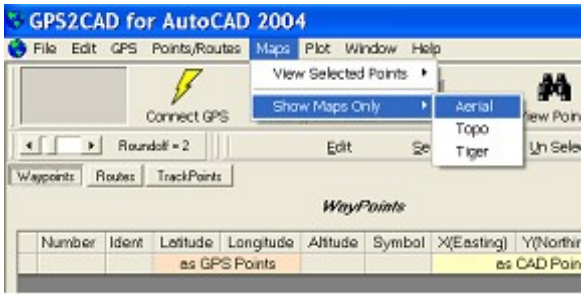
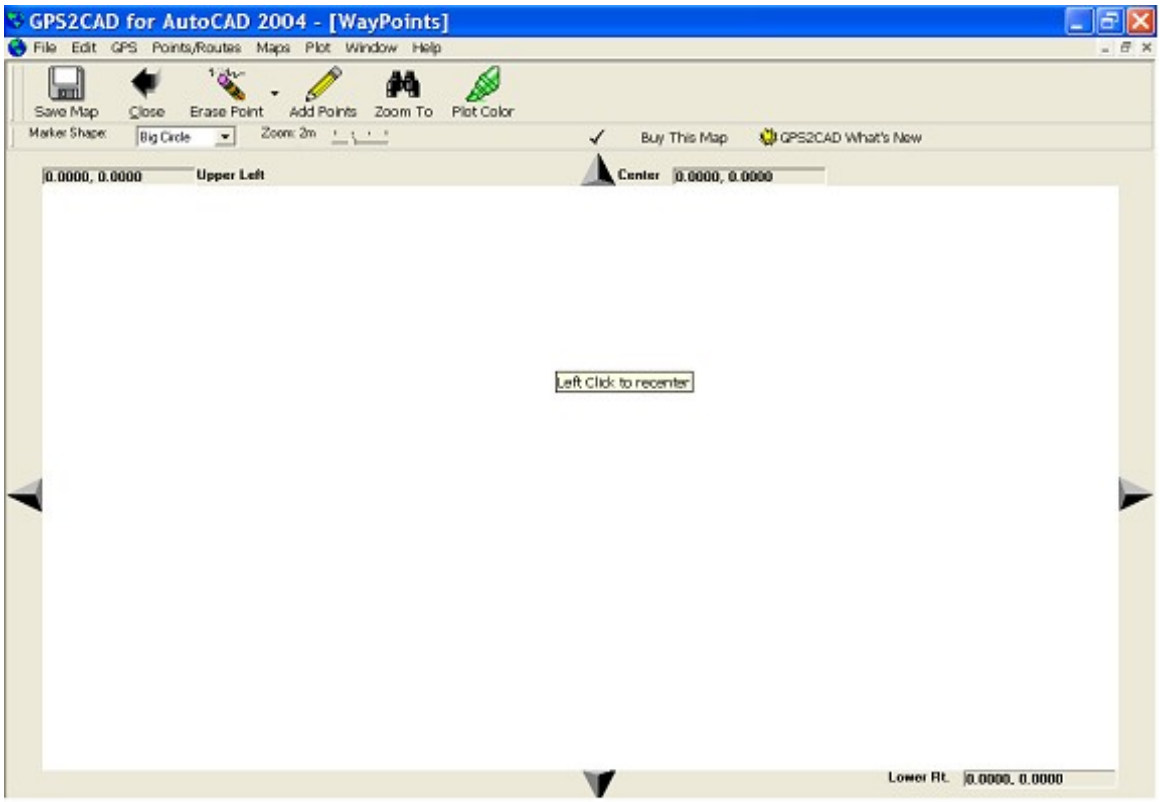
Viewing the Map Window without points

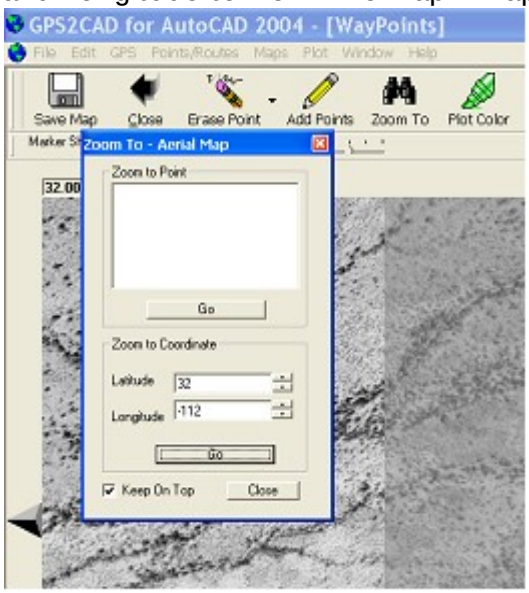
If you do not have points in the main grid, and even if you do not have a GPS connected, you can still go to the map window by using the drop down menu:



This will then take you to a blank map window.



You can then enter a location to view through the "Zoom To" option, and entering the Latitude and Longitude to view. The map will appear with the desired location at it's center.



See "Zoom to Point" for more information.

Example of the map window displayed when no points are selected:

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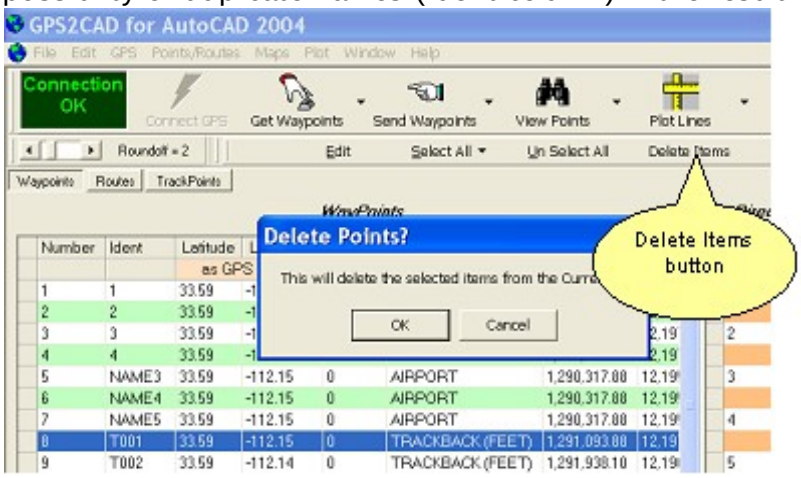
Deleting Points and Routes

Deleting Points and routes is done from the Main Grids (Waypoint, Route, or Trackpoint). In order to delete the points (or route header), you must first select the items, then click the

"Delete Items" button on the toolbar or Edit/Delete Items from the drop down menu. Press ok to confirm your selection.

Note that if you have multiple routes, and delete a route header row, the remaining points will be added to the route above it, and renumbered consecutively. Be sure to check for the possibility of duplicate names (Ident column) in the resulting route.



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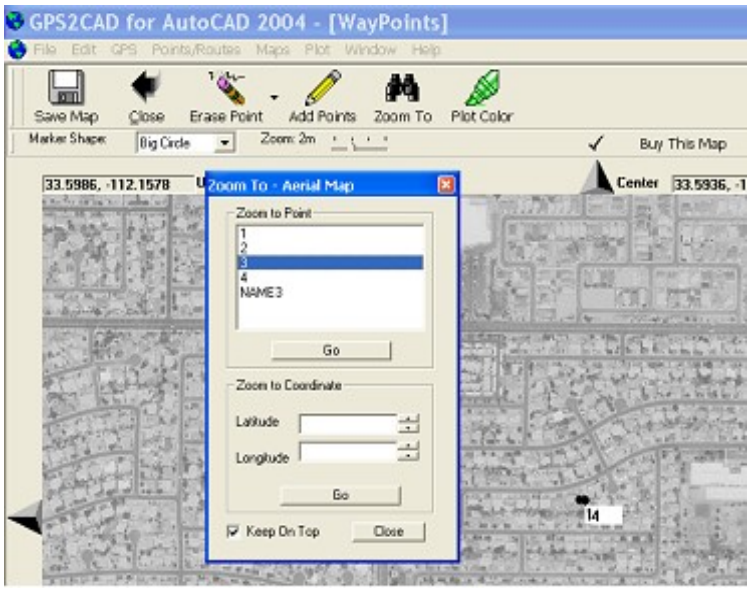
Zoom To Point

An important feature when working with the maps is the "Zoom To" capabilities. This feature is available on the mapping window toolbar, and brings up the Zoom To window. This window allows you to move the map to a specific point or location.

The "Zoom to Point" text box will be populated with the selected points from the grid. By selecting the desired point and the Zoom to Point "Go" button, the map will be recentered (at it's current scale) with the selected point at the center. This is especially useful if one of the selected points is not visible in the current window.

TIP The Zoom to Coordinate" boxes allow you to enter a specific Latitude and Longitude. Pressing the accompanying "Go" button will recenter the map at that location. This allows you to view a specific area without having any points selected or even having a GPS connected. You can also select "Add Points", click on the map, and have the points entered into the grid. From there you can use the points for uploading to the GPS, exporting, or plotting in AutoCAD.

TIP - Use the point preview map to get a "birds eye view" of all the points in one plot.



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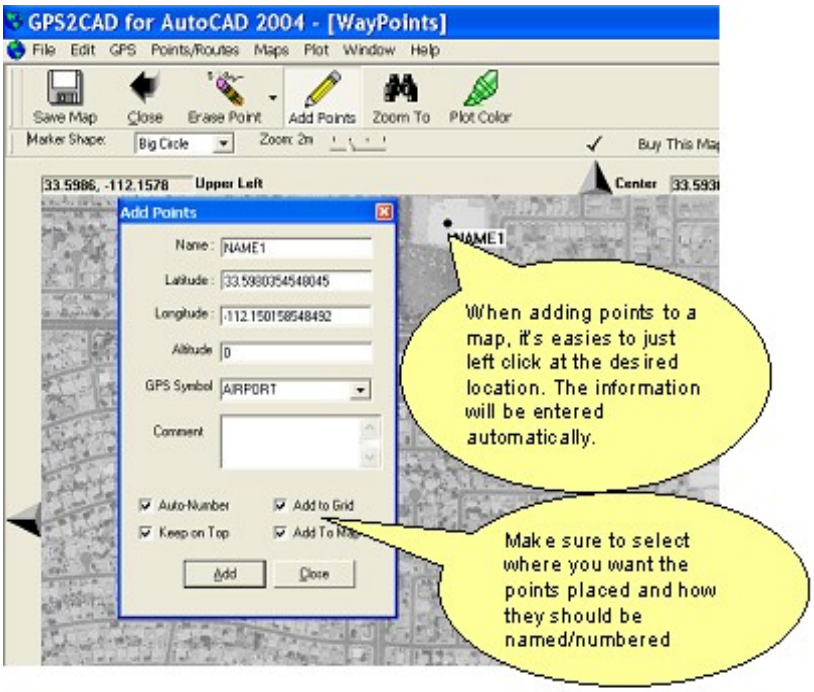
Add Points

Adding points to the map or grid is a simple process.

- Press the "Add Points" toolbar button. The Add Points window will appear
- Check the settings on the Add Points window:
  * Name - if you want a specific name, enter it here. If not, you can use the default
  * GPS Symbol - select the symbol for the point or series of points you are about to enter
  *Comment - enter any comment for the point
  * Add to Grid - if checked the point will also be added to the currently selected main grid
  * Add to Map - if checked the point will be added to the map you are clicking on - (you probably want this checked)
  * Auto Number - especially useful if you are going to enter several points. This lets you click continuously, and each name is appended with a consecutive number.
  * Keep on top - forces the window to remain visible as you work.

The same "Add Points" window is used when adding points to the maps or the grid. However when using in the map window, it is not necessary to press the "Add" button. You can simply place the Cross hair pointer over the location desired and left click. All the point information will be added automatically, based on your settings. The "Add" button is more useful when working from the main window, adding points to a grid.



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Moving around on a map

Moving around (or scrolling) on a map can be done in several ways:

- Clicking on the Direction arrows on the edges of the map - this will move the map in the direction of the arrow
- Left clicking on the map will cause the map to move by placing the click location in the center of the map. This effectively scrolls the map
- Use the "Zoom To Point" feature and select the point to zoom to. This will cause the map to move so the selected point is in the center
- Change the map scale by adjusting the Zoom slider

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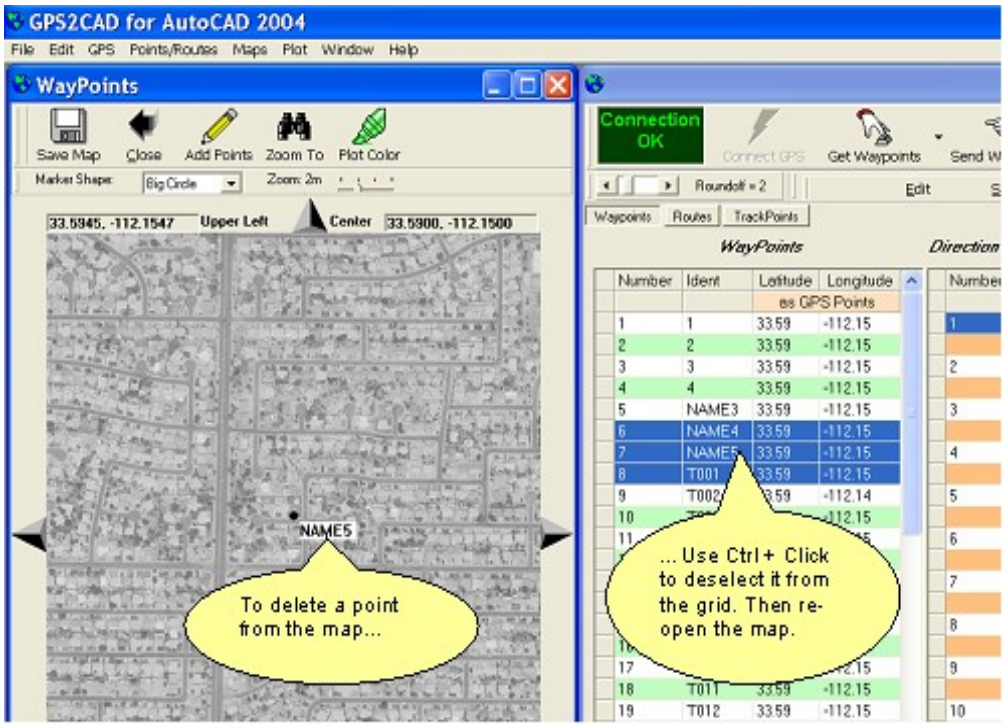
Deleting points on Map

Deleting points on the Aerial or Topo map is done by *unselecting it from the main grid*, and refreshing the map by clicking a scroll arrow, or closing and re-opening the map window. There is no separate control for deleting points from the maps.



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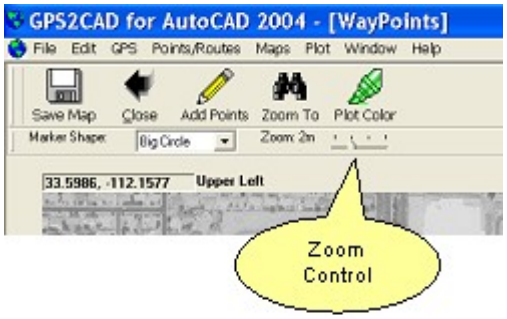
About Map Scale/Zoom

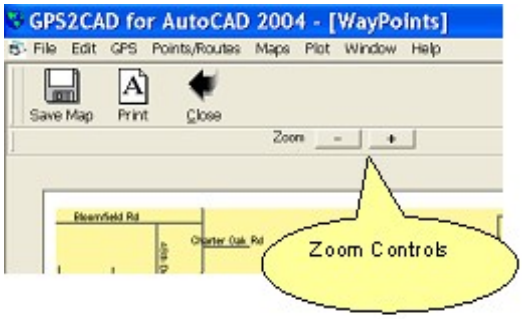
The "Zoom" control sets the scale of the map you are viewing. The scale is actually determined by the type of camera lens and altitude in the case of Aerial Photography, the detail set for scanning in the case of Topo Maps, and the desired enlargement in the case of Tiger maps.

The available scales are generally measured in "Meters per pixel", which effectively represents the level of detail visible and the size the picture covers on the ground. The tiger map is different, being continuously variable. The following shows the scales available:

Map Scales (Zoom)

Map Type	1 Meters/pixel	2 Meters/pixel	4 Meters/pixel	8 Meters/pixel
Aerial	x	x	x	x
Topo		x	x	x
Tiger		Varies continuously		





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About using the maps in AutoCAD

We knew you'd be interested in this, so we want to answer it. You can save the Aerial, Topo, and Tiger maps to an image file, and that file can be imported into AutoCAD. However the image will not be scaled properly, and you will have to change the image to the proper scale.

This is not particularly easy. You must find known points on the map, measure the distance in (ACAD units) between them, and compare it to their actual distance. Then adjust the map size to match by changing the scale of it's insertion.

You can also plot the points from the grid into AutoCAD, and try scaling and aligning the bitmap to line up with the plotted points.

If this is done carefully, you can come up with a fair resemblance of the map image at true scale in AutoCAD. However the quality of the image may degrade, depending on how much it is scaled.

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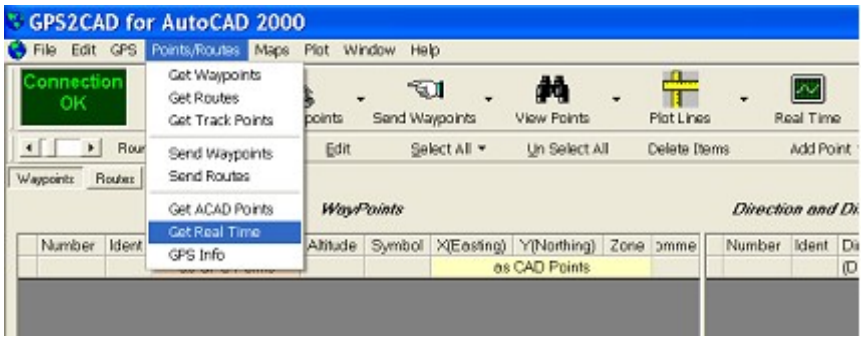
Real Time Capture

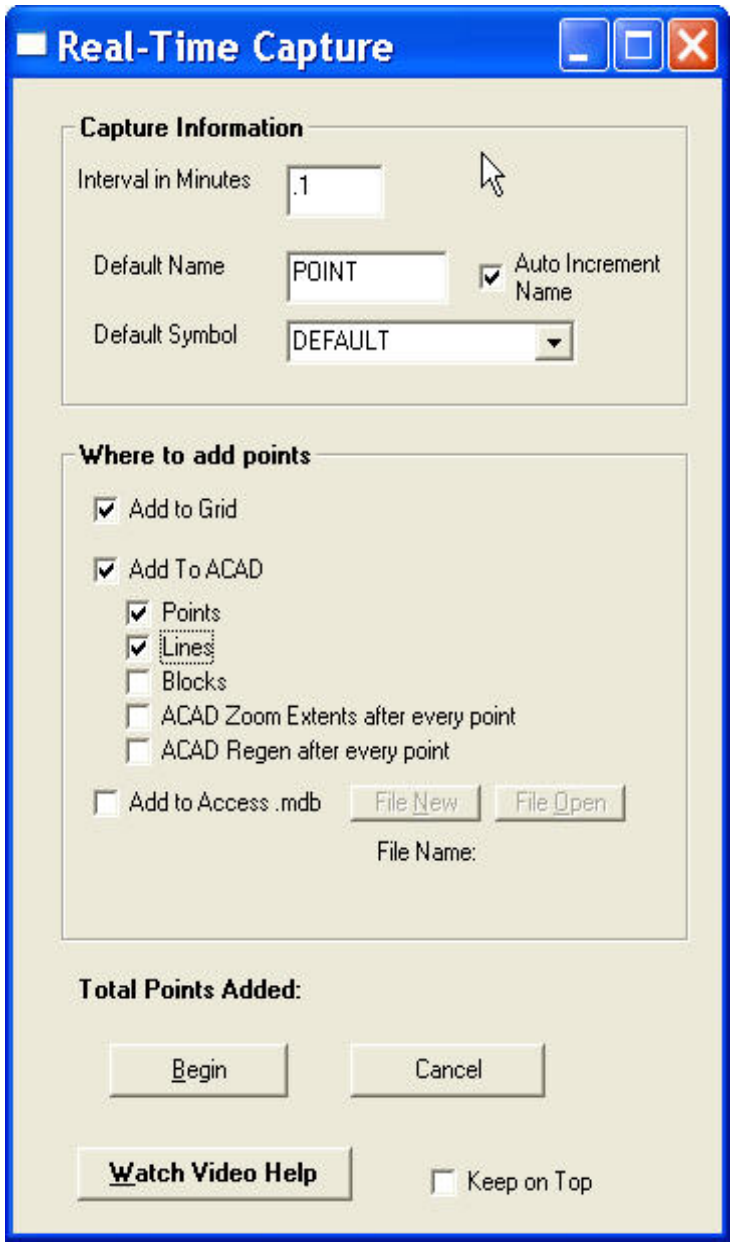
Capturing Points

One of the great features in GPS2CAD is it's ability to capture the GPS points at a pre-set interval, and save the points to the point grid, to AutoCAD, or to a Microsoft Access 2000 database.

To use the Real Time Capture, first make a connection to the GPS unit, then click on the toolbar button "Real Time" or the drop down menu item:



The Real Time Capture window will appear:



Provide the requested information:

- Interval in minutes - enter the desired interval in minutes (or decimal fractions) that you want to capture the GPS points
- Default Name - enter a default name to use
- Auto Increment Name - checking this box will automatically add a consecutive number to the end of the Name. In most cases, leave this checked
- Default symbol - select the symbol to assign to the captured point. If you're not sure, select "Waypoint"
- Add To Grid - If you want the point to be added (appended) to the current grid, check this box. The point will appear with the coordinate translations and other information
- Add To ACAD If you want to add the points to Your AutoCAD drawing, make sure to start AutoCAD and begin a drawing. Select the items you want to plot. Plotting points and blocks will provide the same results as plotting from the main grid. However plotting lines will product line segments, not Lightweight polylines. If you want them as a continuous line, you

must convert them to a joined polyline in AutoCAD

* ACAD Zoom Extents after every point
* ACAD Regen after every point

These two settings are designed to make it easier when capturing and plotting into ACAD on short time intervals. On occasion, you may be capturing points within seconds of each other, and place a heavy load on AutoCAD's ability to keep up with the zooms and regens. If this becomes a problem, try unchecking these selections until you find a combination of zooms -regens - capture interval that works for your setup.

- Add to Access - this adds a points to an Access 2000 database. If you want to start a new database, click File New, and if you want to append to an existing database, click File Open. Note that the existing database has a specific structure and must have been created using GPS2CAD. There is a special section on capturing on Access here.

Once these selections are made, click Begin to start the capture.

The start button will switch to a pause button. Click pause if you need to temporarily pause the capture, or Cancel to stop completely.

Here are a few tips about using this feature:

You can add points to Grid, ACAD, and Access all at once if you want, or any combination of the three.

Try plotting lines in AutoCAD with a very short capture interval (i.e. 0.1 min) and switch to AutoCAD to watch the line grow. If you are stationary at your desk, the resulting plot shows the accuracy of your GPS unit - the shorter the lines, the more accurate.

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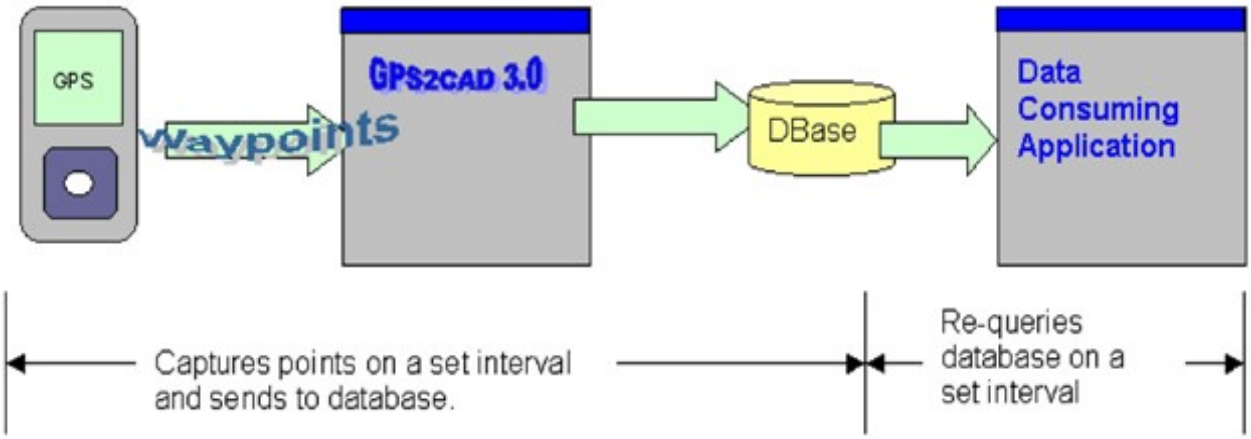
To Access

The program will capture points and place them into an Access 2000 database. This gives you the potential of writing an application that reads this information as it comes in and processing it as you need to. Note however that there may be some concurrency issues in multi-user access to the database.

The database is opened with a dynamic recordset, which provides a live view of the data. But the application that consumes this data must perform a periodic requery of the database to see the changes. An Illustration of Real Time Capture to a database:



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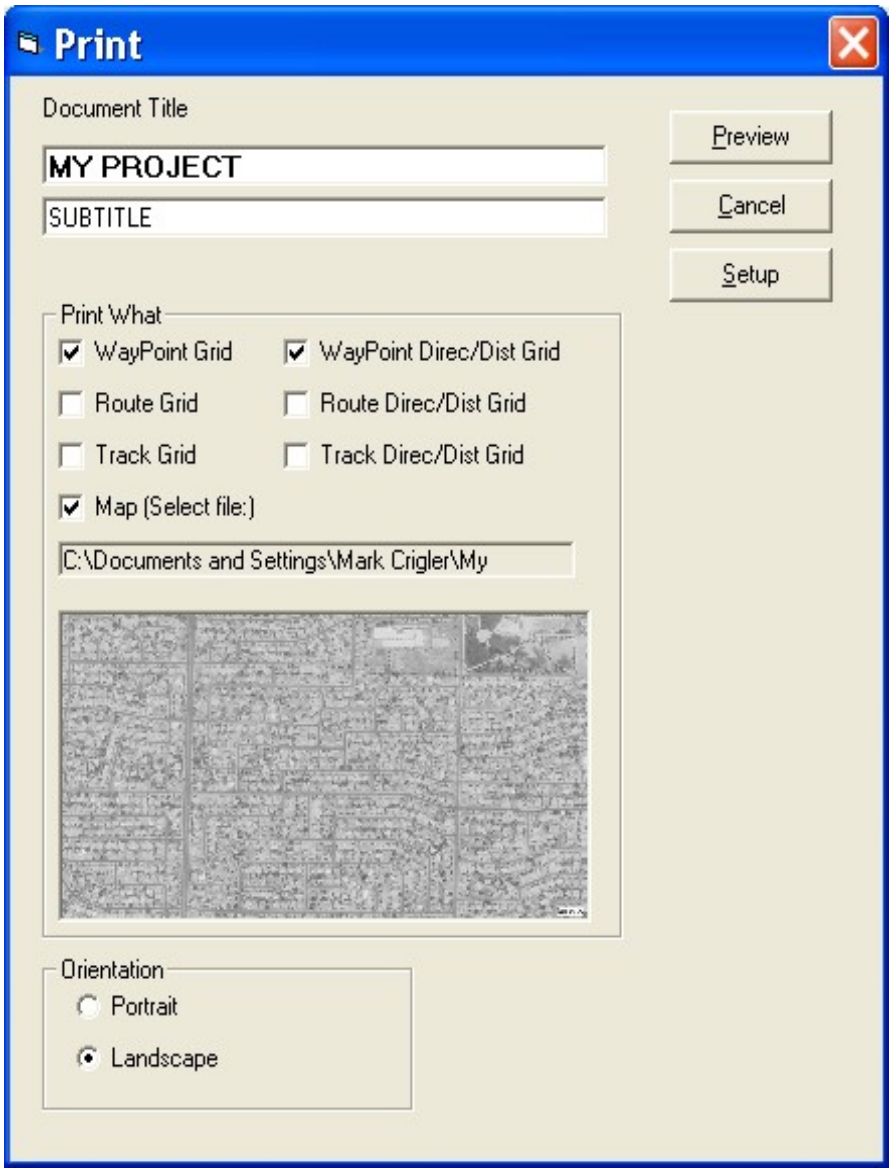
Printing

Printing

The Print dialog box allows you to place selected information on the finished print document, and to select the information you wish to print. You may choose to print:

- Any of the main grids or the Direction Distance grids
- A map you have saved from one of the Aerial Photo, Topo Map, or Tiger Map windows. If you check this box you will be prompted for a file name. Choose the file you saved from one of the mapping windows; the file name will appear below and a small preview of the file will appear in the larger box.

Once you have finished selecting the items you wish to print, click "Preview". You will be taken to the Print Preview window where you can make a final check on the layout and print the document.



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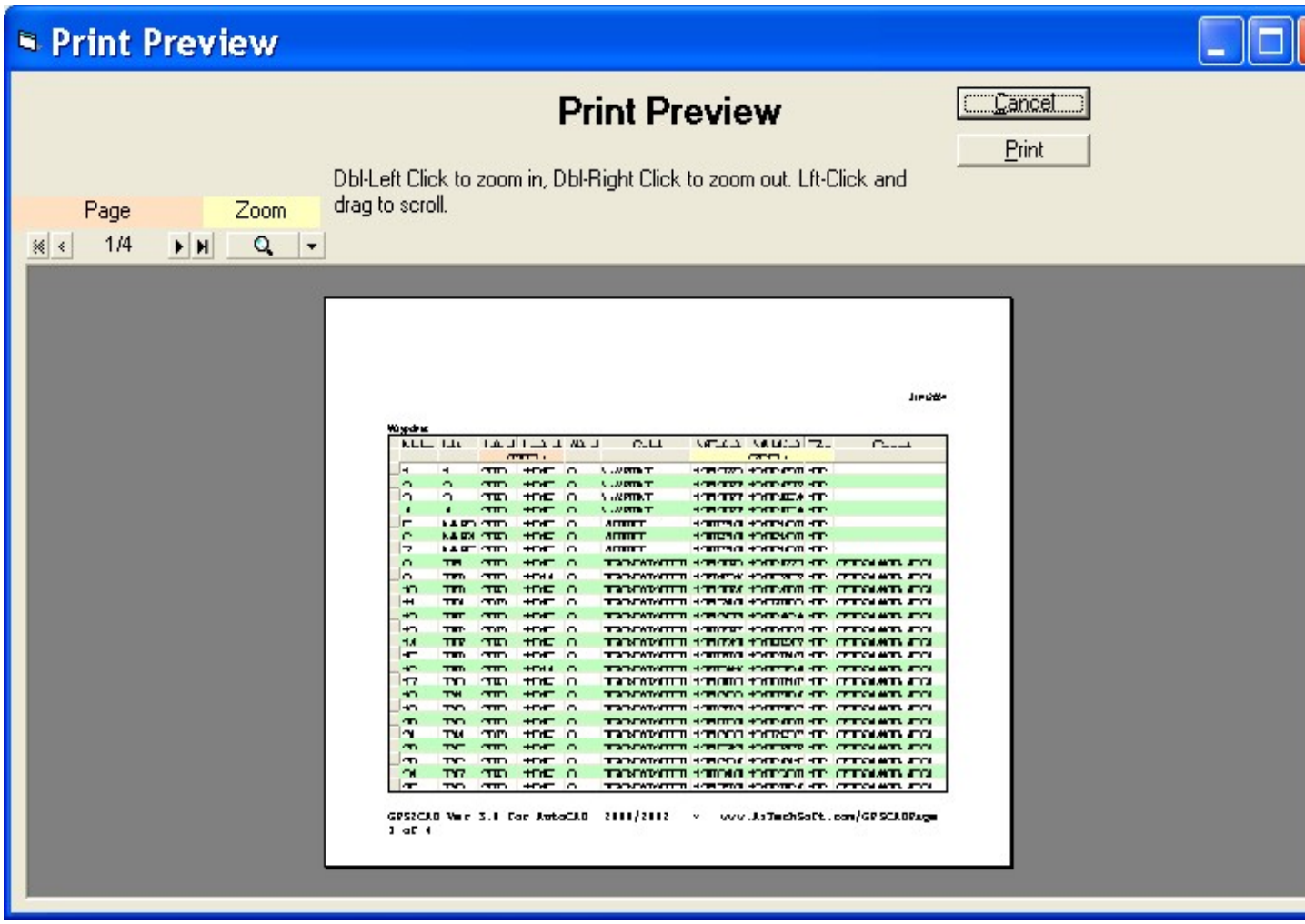
Print Preview

The print preview window allows you to view the documents you are about to print, and either continue printing or cancel. The controls on this page are simple:

Page slider bar lets you switch to multiple pages
Zoom - lets you zoom in and out as necessary
Cancel - cancels the print job
Print - Prints the document



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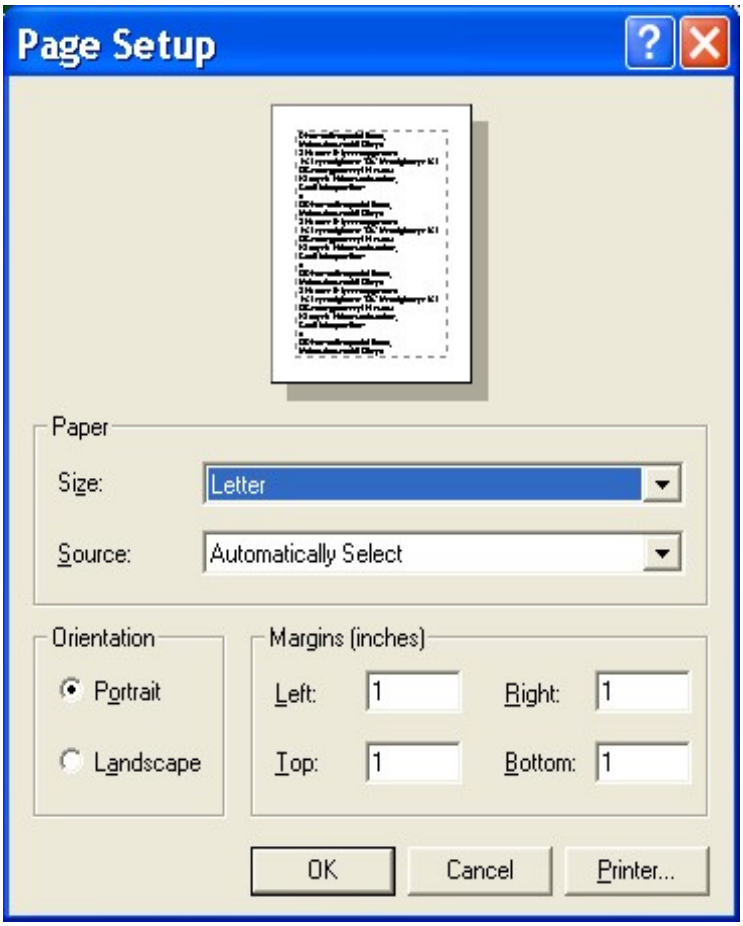
Print Setup

This is a standard Windows Print setup box. Review the settings before printing.



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Importing and Exporting data

Introduction

Beginning with GPS2CAD Version 3.5, a new Import/Export "Engine" is provided. This feature allows far greater flexibility and compatibility with other sources of data.

Importing Points:

- AutoCAD - this is an upgraded feature from earlier versions of GPS2CAD. It allows you to import points from the AutoCAD drawing that is currently running into the main grid. From here they can be uploaded to the GPS unit or viewed on the maps.
- Garmin's MapSource program - This popular program is frequently distributed with their GPS units, or is available separately. GPS2CAD will import files that are EXPORTED from this program (not their saved project files)
- Magellan's MapSend program - This program is available from Magellan and is used to manage waypoints and maps. GPS2CAD will import files that are EXPORTED from this program (not their saved project files)
- Other sources - A complete import "Wizard" is provided to work with generic text files that are created by many other industry standard programs.

Exporting Points:

- .dxf - The most popular format for exchanging data between programs. Using this will allow you to use GPS2CAD with many other programs such as AutoCAD LT., IntelliCad, TurboCAD, and others

- Access 2000 Database - points are exported in a .mdb file
- Text File - comma or tab delimited text files can be exported

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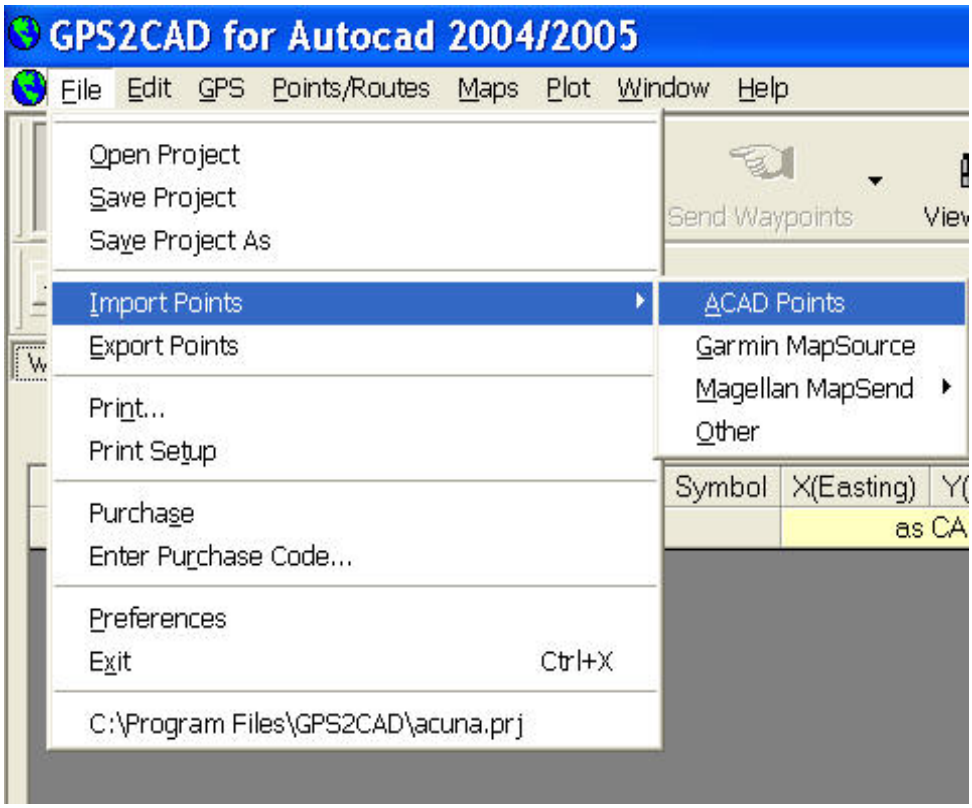
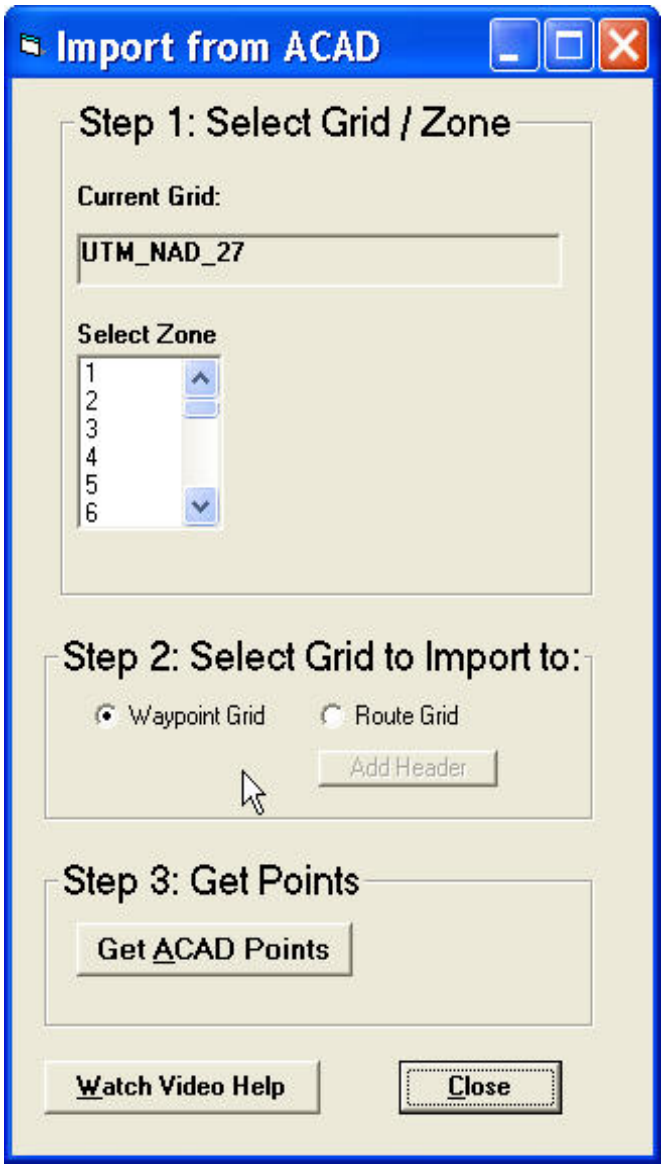
Importing Points FROM AutoCAD

Points can be uploaded from AutoCAD to GPS2CAD by following this procedure:

- Open the AutoCAD drawing, switch back to GPS2CAD
- Go to File/Import Points/ACAD Points



- Read the Import Information box, and click OK
- The following window appears:



- Enter the ZONE that the points are in. You must know this in advance in order to import the points. If you choose the wrong zone, the resulting Latitude/Longitude translation will be incorrect.

If you do not know what zone you are in, and the points are near to your current location, you may get the zone by setting your GPS to read out in the same UTM system, and checking the zone that is displayed - but only if the points are in the same zone that your GPS is in.

- Select the Grid to import the points into. If you choose the Route grid, you may need to add a route header (the dark blue grid line that has the name of the route). You can do this by clicking the Add Header button, and supplying the requested information

- You should be taken to the AutoCAD drawing with a selection cursor active
- Select the Lightweight Polyline, points, or blocks to upload. In the case of a polyline, it does not matter which end you select - the veritcies will be entered only one way.
- The points will be placed into the selected grid.

Note that it is important to understand the following :

1. If you select one of the UTM datums, you must supply the Zone that the points are plotted

in. In order to make the correct coordinate calculation, GPS2CAD must know what Zone the ACAD coordinates refer to, and there is no information maintained in AutoCAD that can be used.

2. When uploading points from AutoCAD, you must select the SAME DATUM that they were originally plotted in. For example, you CAN'T DO THIS:

- Download points from GPS into a Grid with the project Datum set to UTM_NAD27
- Plot the points into AutoCAD. They will be plotted based on the coordinates shown on the grid and the Datum Selected when downloaded
- Upload the points from AutoCAD and SELECT A DIFFERENT DATUM THAN UTM_NAD27

Normally during a working session, this mistake would not be made. The real risk occurs when the drawing is saved, and then re-opened another time, with a new session of GPS2CAD running. There will be no indication in ACAD what datum the points are plotted in, and the DATUM running in GPS2CAD MAY HAVE CHANGED. If you try uploading the points from AutoCAD, the resulting Latitude/Longitude calculations WILL BE WRONG!

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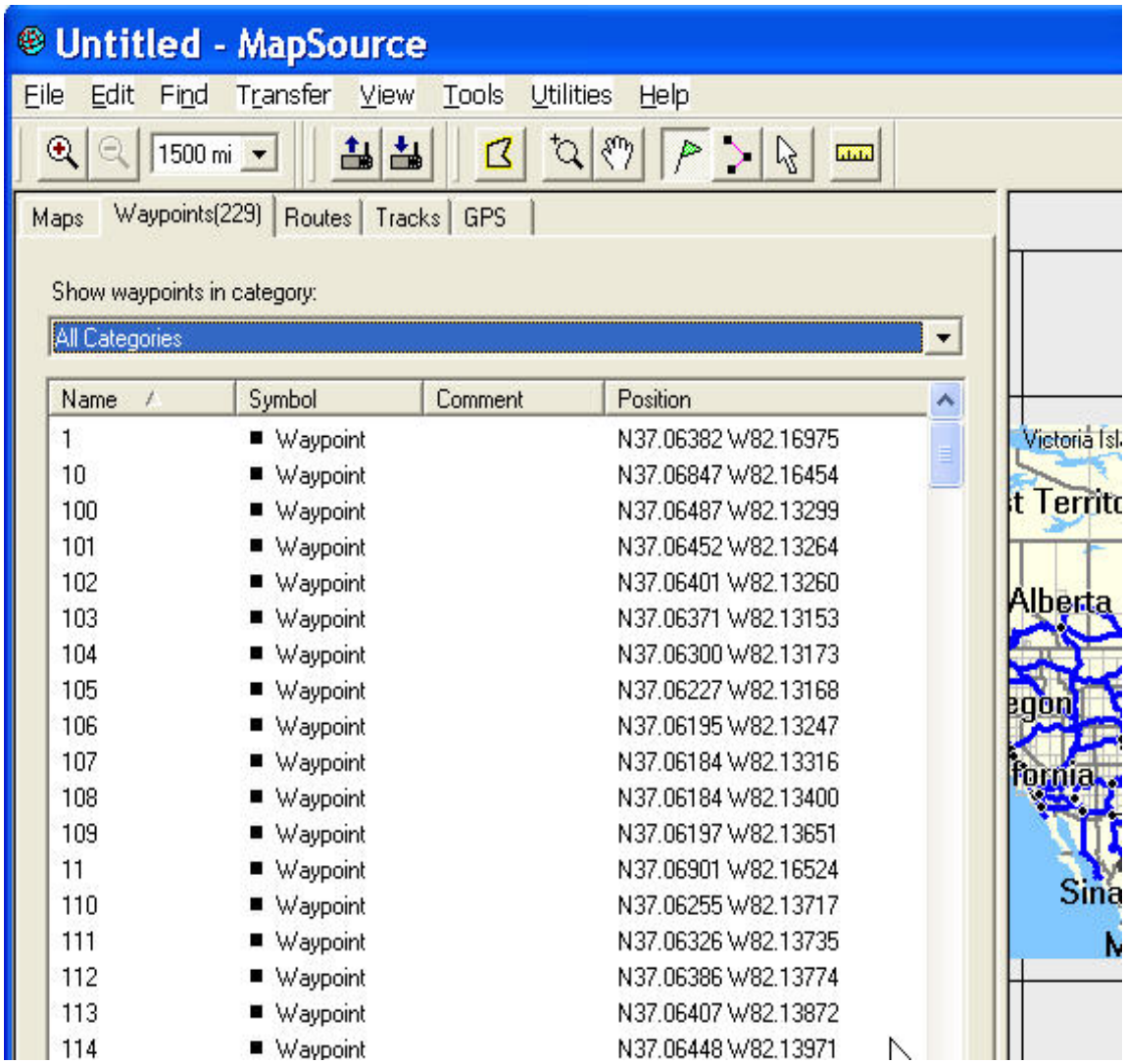
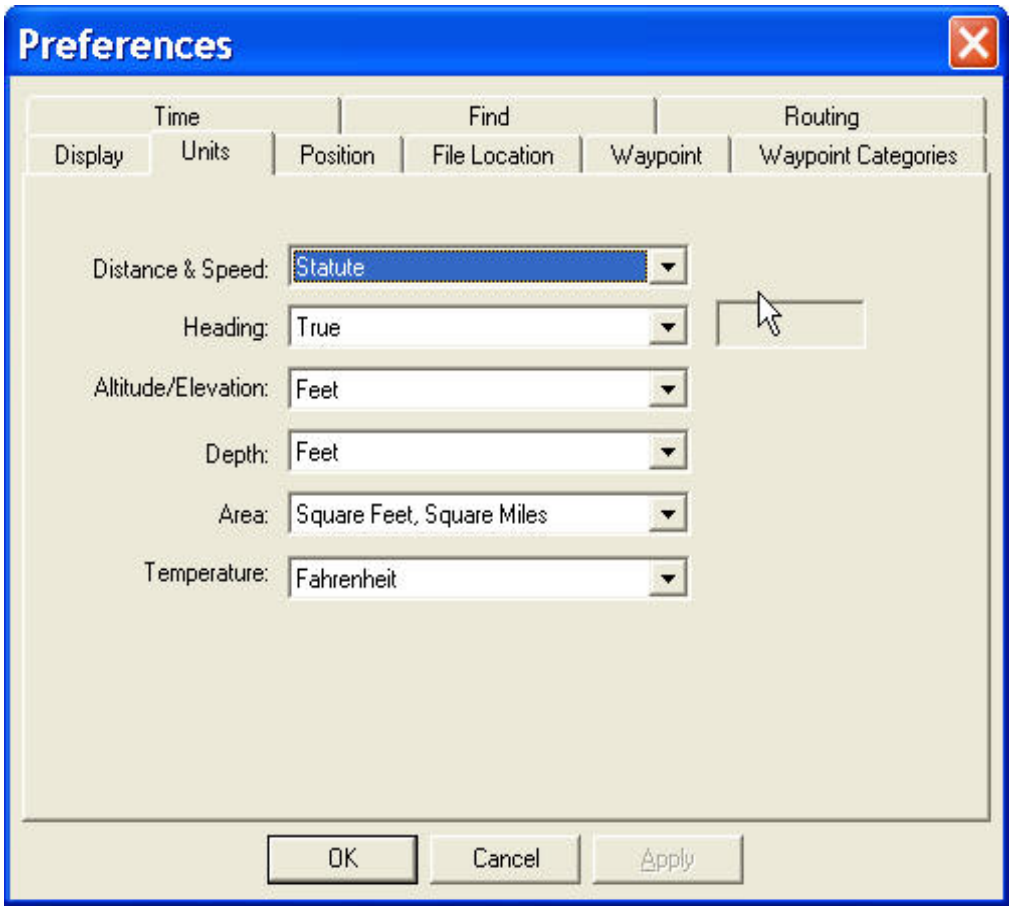
Importing from Garmin's MapSource

Step 1: Inside MapSource

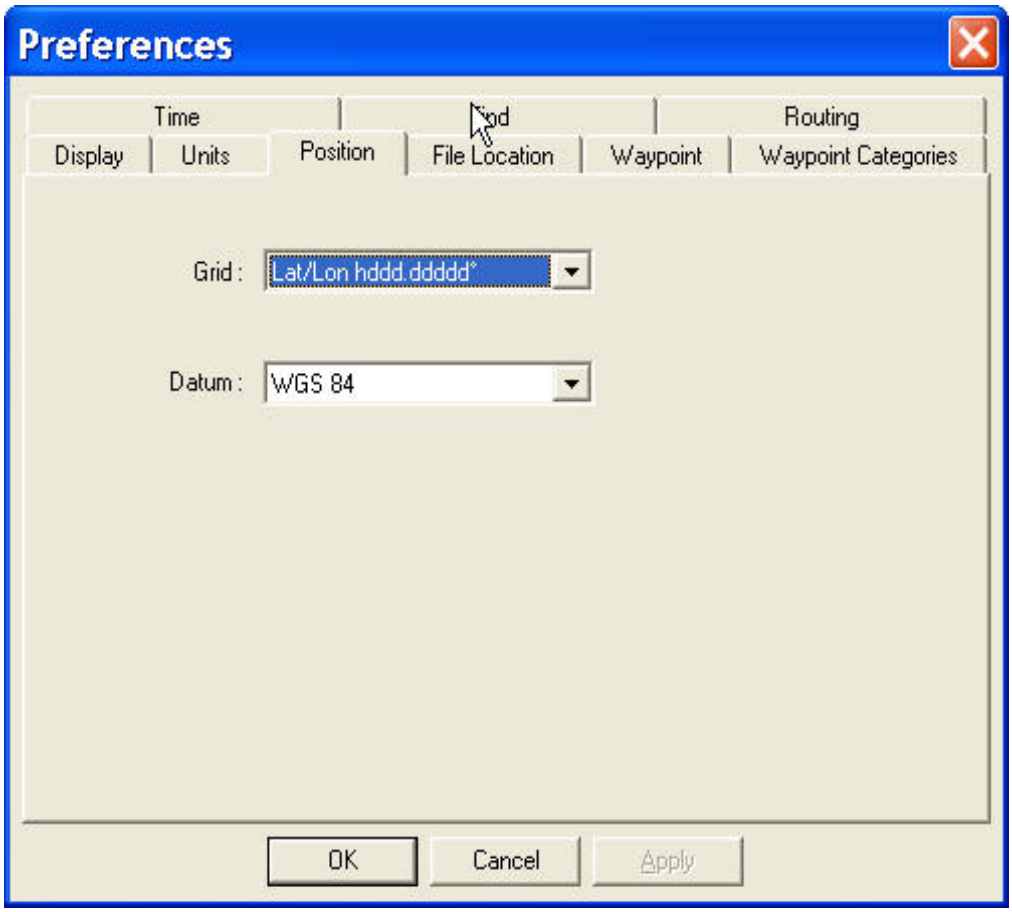


- Download the points into the program
- Select the Waypoints tab to view the waypoints
- From the drop down menu select Edit\Preferences\ Units tab; Set the Altitude/Elevation box to Feet, and the Distance & Speed to Statute.

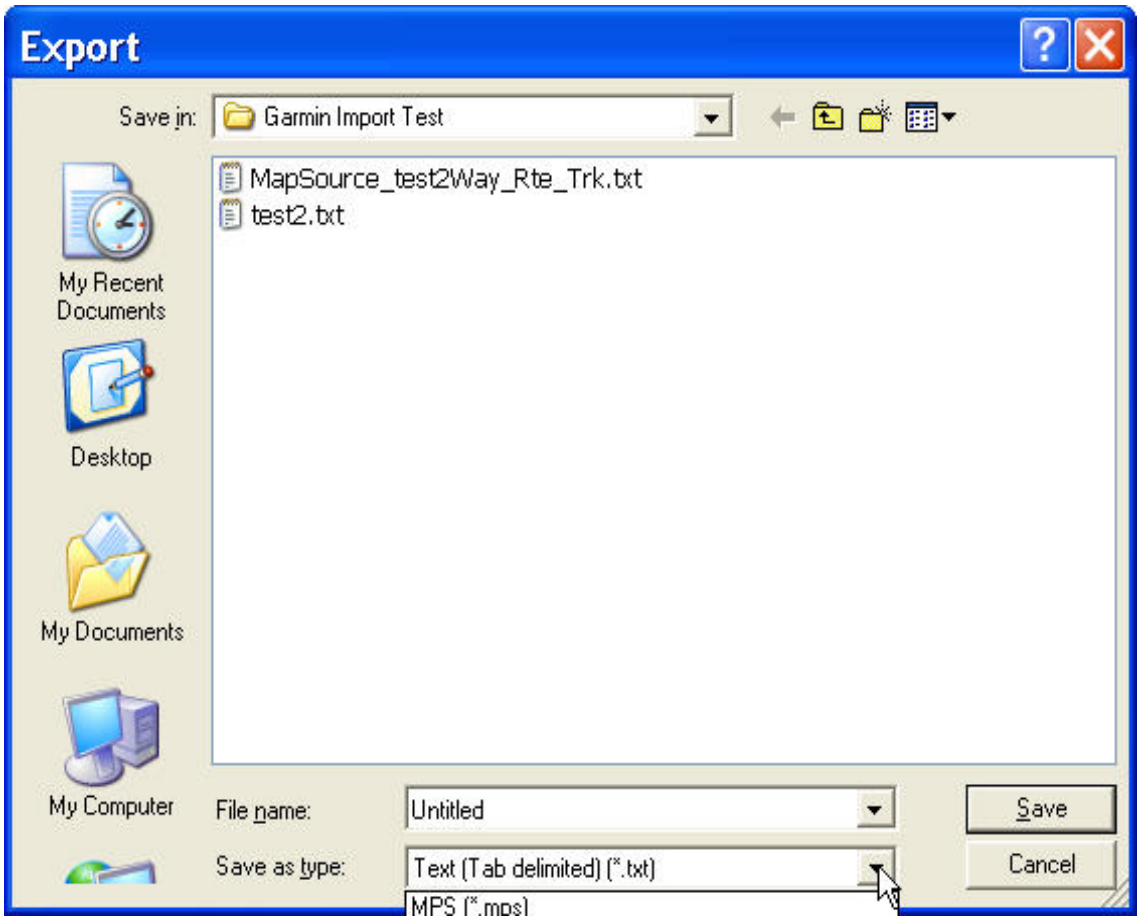
The distance and speed setting in MapSource is not used because only latitude and longitude values are imported to GPS2CAD.



- From the Position tab, select Grid: Lat/Long hddd.ddddd, and Datum: WGS 84



- Go to File/Export. Choose Tab Delimited/ *.txt file and supply a name. Click ok to save



Step 2: Inside GPS2CAD

- Go to the File/Preferences/Grid and Units tab and set the Units to INT_FOOT
- Select the Datum you want the points translated to. Save and Close Preferences
- Go to File/Import Points/Garmin MapSource, click
- Review the information in the next window, click OK
- Select the file, click OK to import

The points are now in the main grid and can be used as any GPS points.

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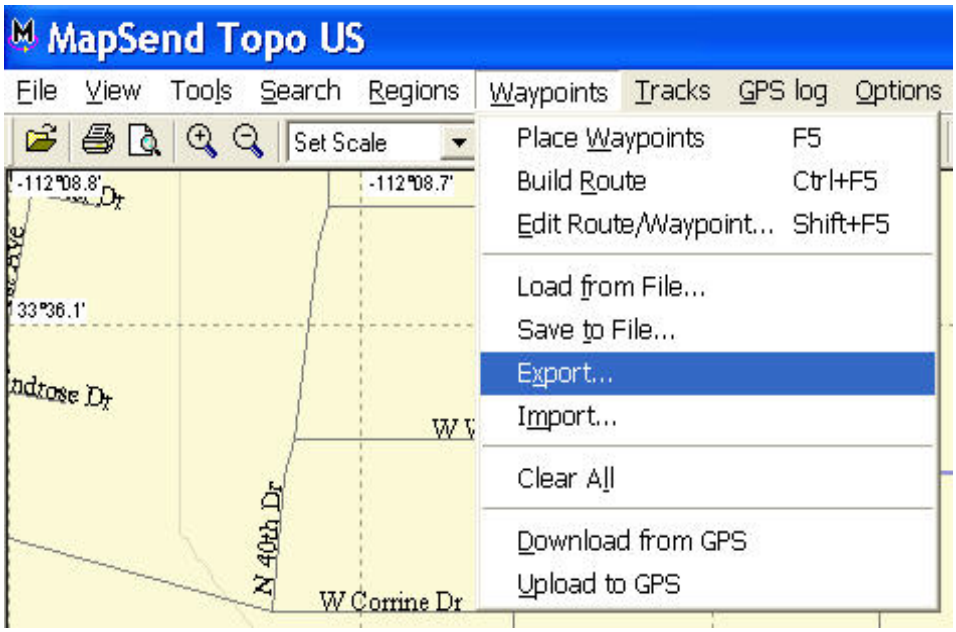
Importing from Magellan's MapSend

To import a Magellan Waypoint/Route file follow this procedure:

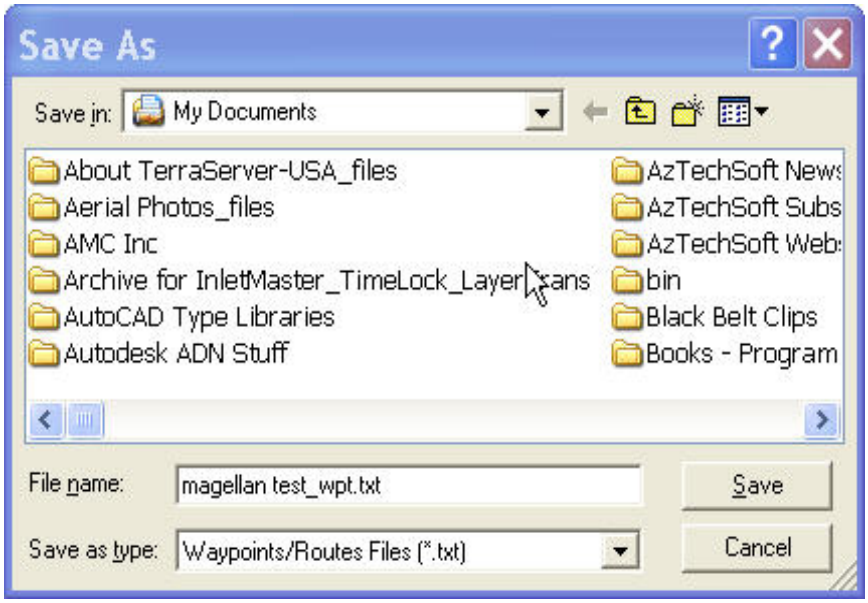
Step 1: Inside MapSend

When working with Waypoints:

Go to Waypoints\Export



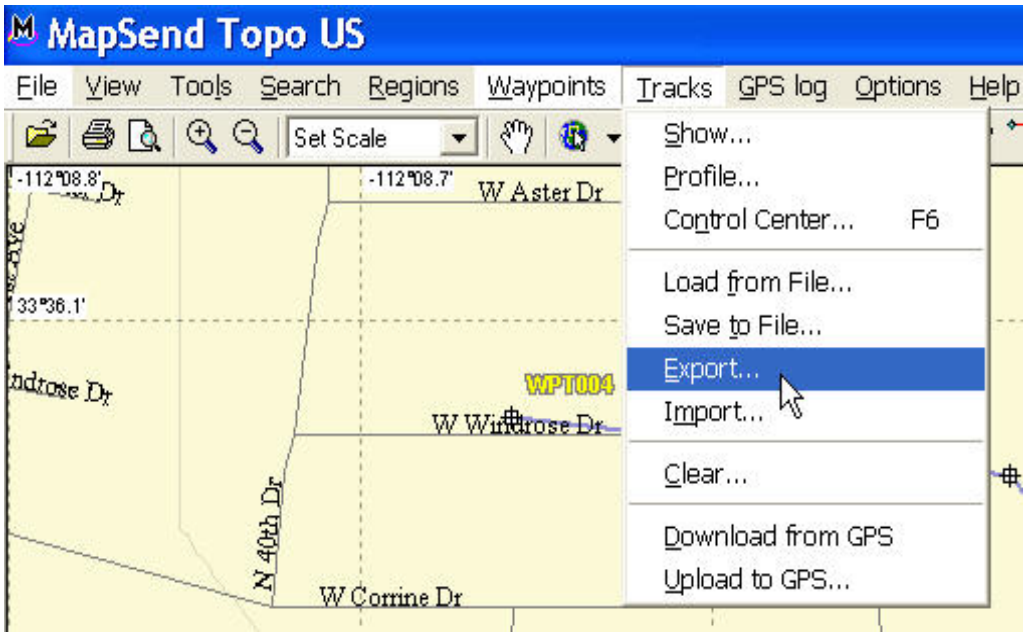
Enter the File Name
Select Waypoints/Routes Files (*.txt)
Click Save



Select this file for import to GPS2CAD

When working with Tracks:

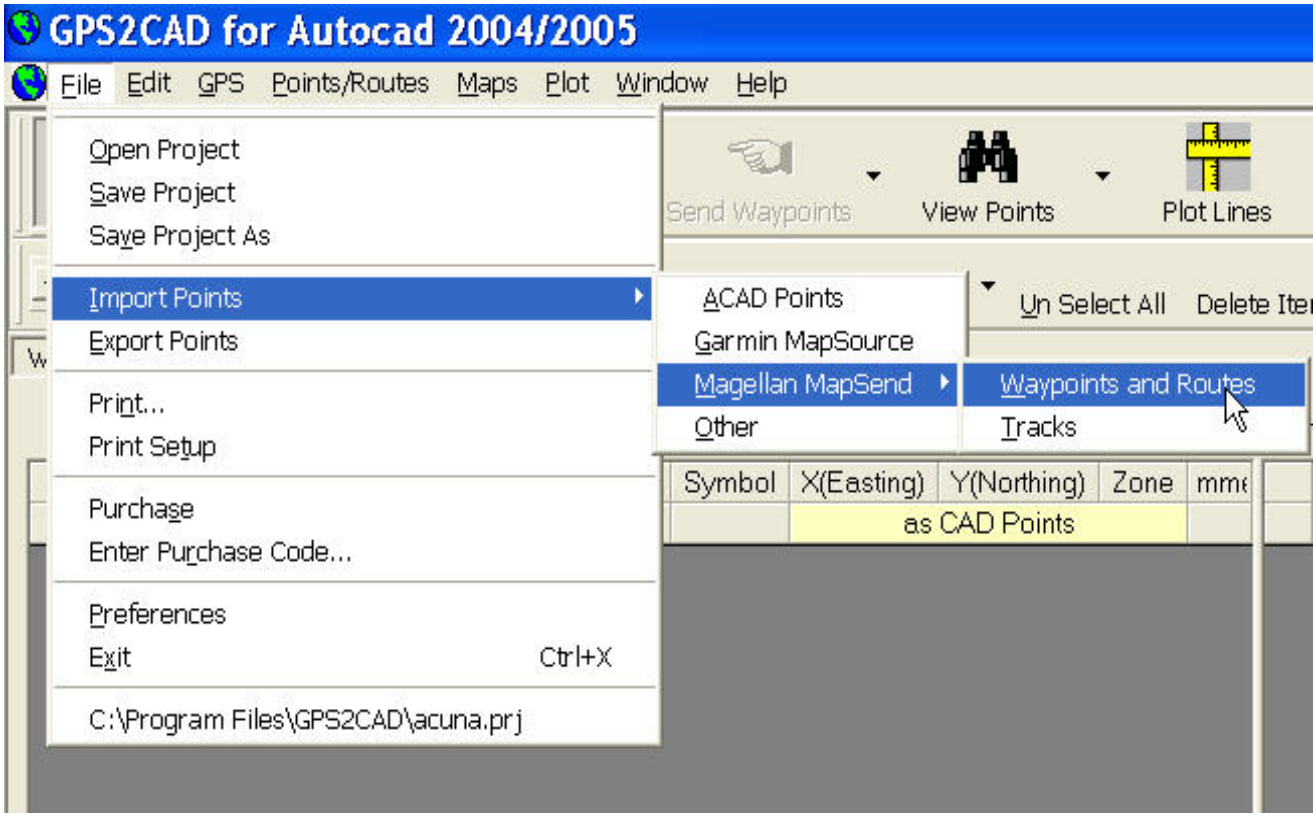
Go to Tracks/Export



Select this file for import to GPS2CAD

Step 2: Inside GPS2CAD

- Go to File/Import Points/Magellan MapSend/Waypoints and Routes {or} Tracks
- View the Information Window, click OK
- Select the File you exported from MapSend
- The files are imported to the main grid



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Importing from Other

The "Other" selection begins the Import wizard, designed to import points from a jvariety of text files or an Access 2000 database file. The wizard is straight forward, containing 8 disticnt steps. There are many helps along the way to make the import easier.

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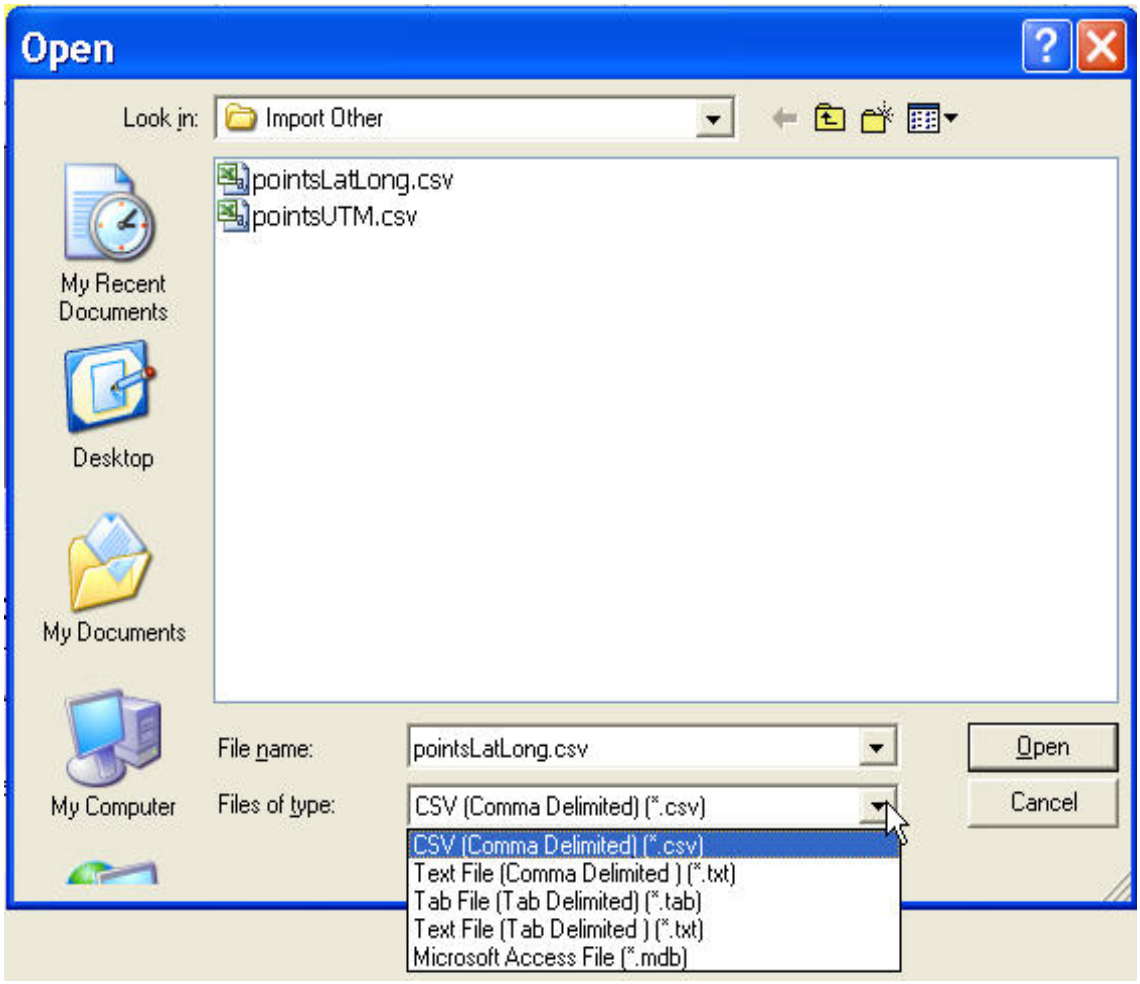
Get Points tab

The first step in importing a text file is the Get Points tab. Click the Get Points button and the following dialog appears. Note that several types of files can be imported:

- Comma Delimited (.csv)
- Comma Delimited text (.txt)
- Tab Delimited text (.tab)
- Tab Delimited text (.txt)
- Microsoft Access 2000 Database file (.mdb)



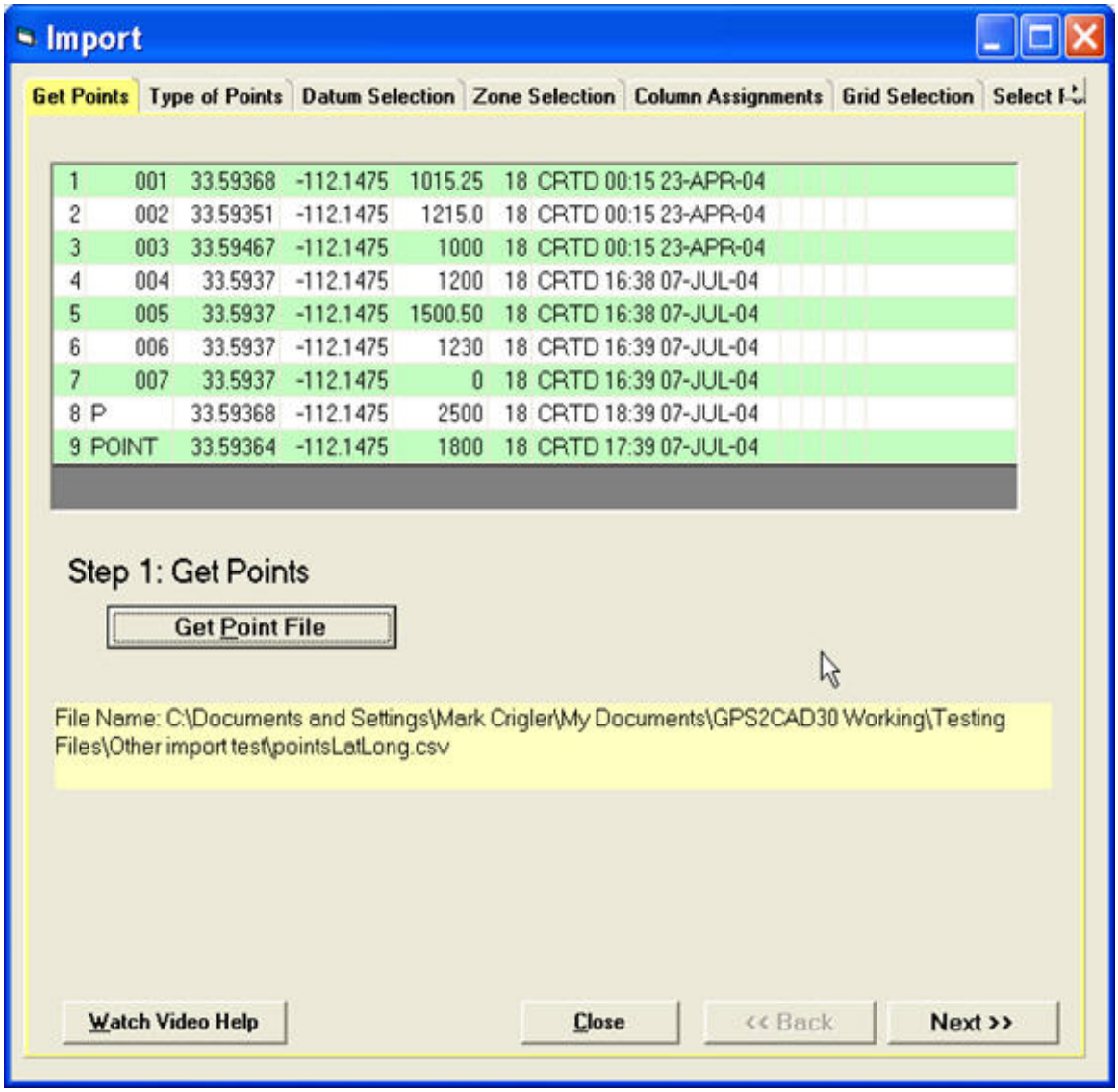
Select the desired file. If you are not sure about what kind of Text file you have, try opening it in Notepad to determine the kind of delimiters it uses.

Once you open the file, the main import grid is populated with them information, one line at a time. From this point on, the type of file delimiter you selected does not matter.

The path to the file is displayed in the label below the grid. This is only for reference during the process.

There is no practical limit to the number of points that can be inserted from the import file.

Click the NEXT button to continue.


Import
Get Points
Type of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
9 POINT 33.59364 -112.1475 1800 18 CRTD 17:39 07-JUL-04
Step 1: Get Points
Get Point File
File Name: C:\Documents and Settings\Mark Crigler\My Documents\GPS2CAD30 Working\Testing Files\Other import test\pointsLatLong.csv
Watch Video Help
Close
<< Back
Next >>

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Type of Points tab

Step 2 - Choose the type of points

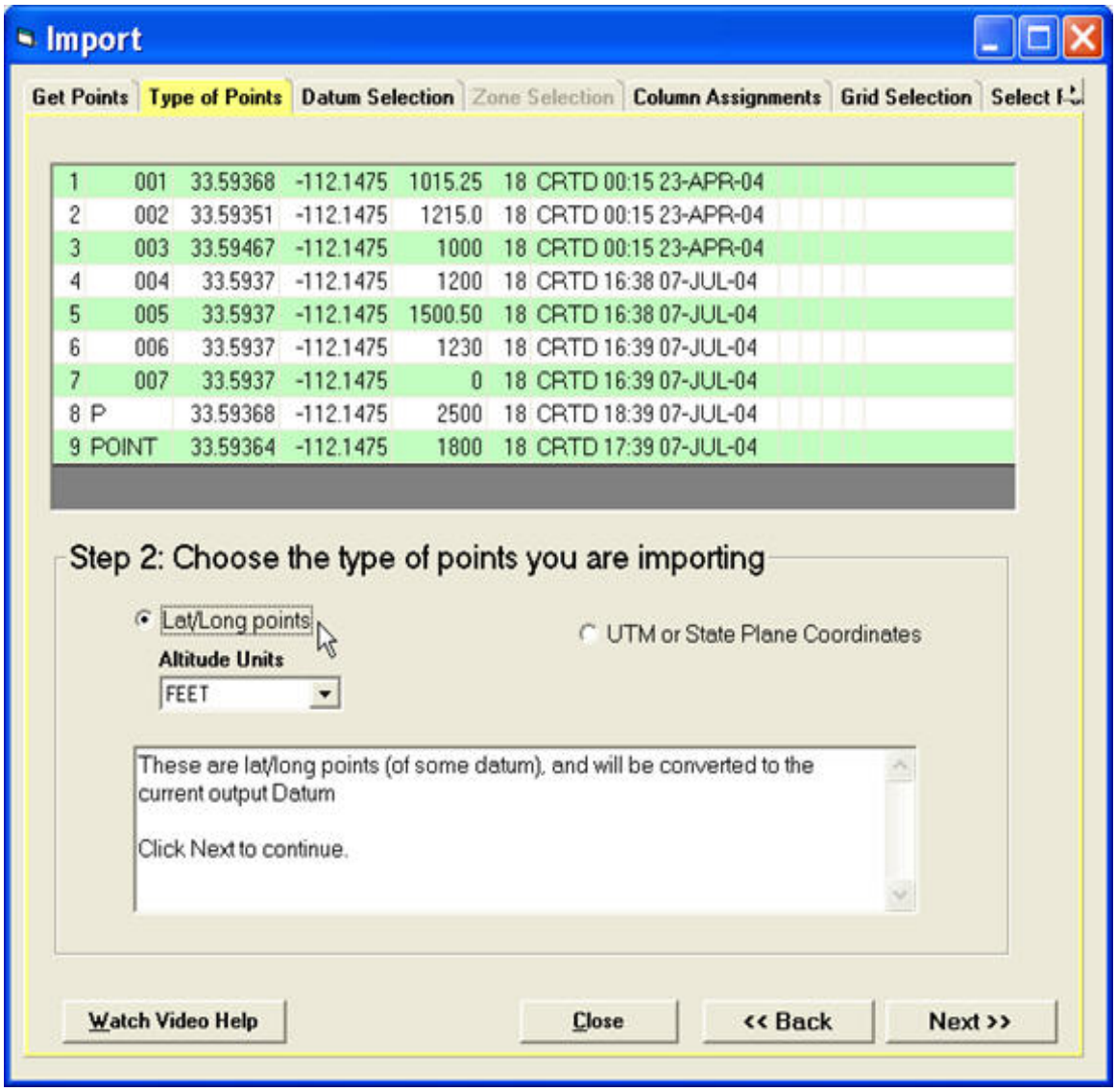
The wizard does not yet know what kind of points you are importing, so you must tell it on this tab. Two kinds can be imported:

Lat/Long points - if the text file contains the point location in DECIMAL latitude and longitude, select this. When you choose this, you must also tell the wizard what units the altitude are in (for the incoming file); make this selection

UTM or State Plane Coordinates - if the points are in an XYZ system, make this selection.

Notes:

1. When importing Lat/Long points, they MUST be in Decimal Degrees. If they are not, and the program that generated the file can not export them in this format, you may be able to put them into an Excel spreadsheet, and have a column formula that creates the decimal degrees, then re-export the file. Future editions of GPS2CAD will expand this units selection.
2. You may have a text file that has Lat/Long AND XYZ formats. In this case, simply choose which one that you want to use.
3. Since you can have points in Lat/Long or XYZ format, this can become a "batch convert" from one datum to another.
4. Note the text box at the bottom that provides feedback as you continue through the wizard.


Import
Get Points
Type of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
Select F
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
9 POINT 33.59364 -112.1475 1800 18 CRTD 17:39 07-JUL-04
Step 2: Choose the type of points you are importing
Lat/Long points
UTM or State Plane Coordinates
Altitude Units
FEET
These are lat/long points (of some datum), and will be converted to the current output Datum
Click Next to continue.
Watch Video Help
Close
<< Back
Next >>

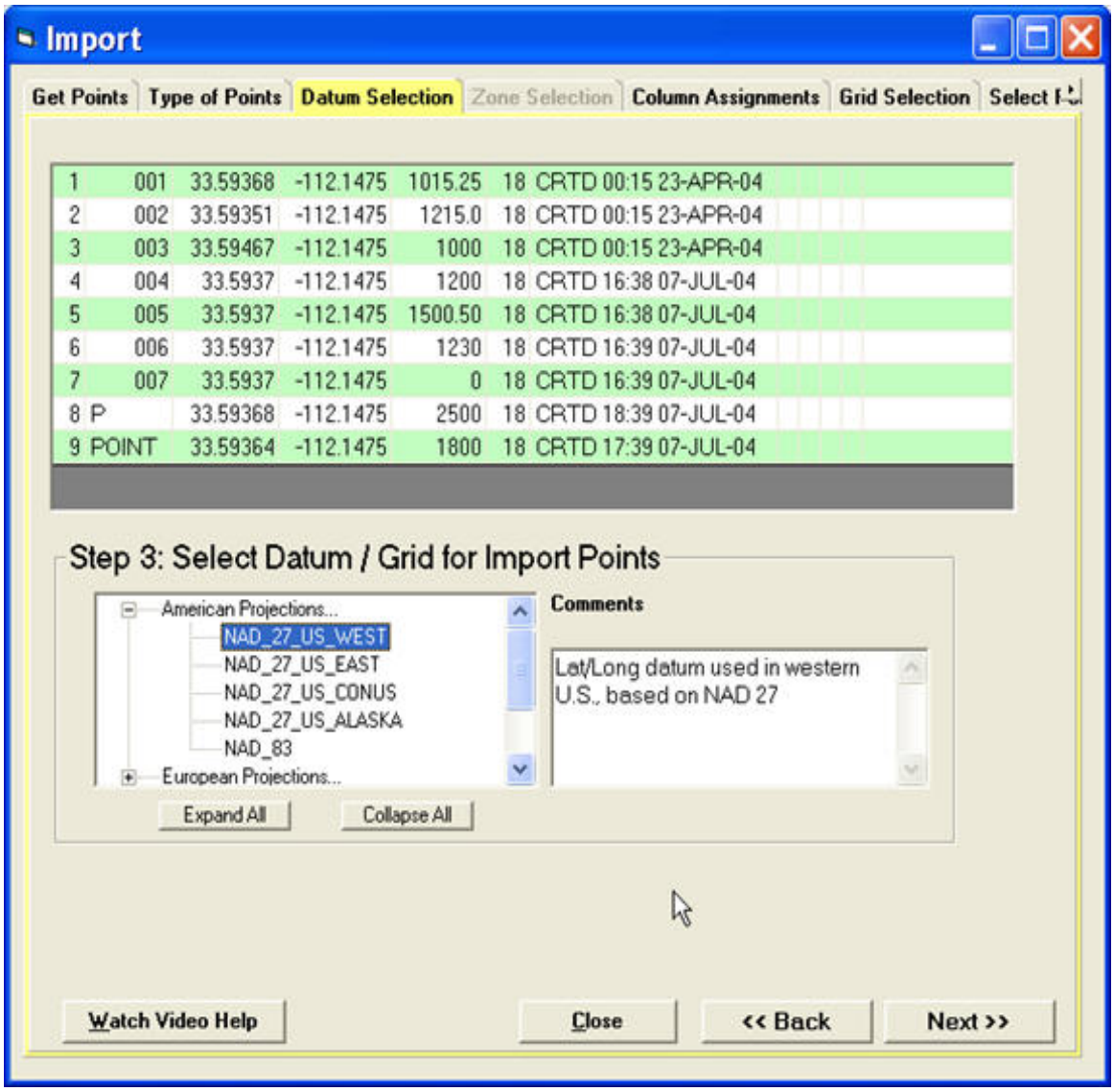
-o-

Datum Selection tab

Step 2 Select Datum / Grid for Import points

On this tab you tell the wizard what datum the incoming points are in. The selection box resembles the same one as in the Preferences window, with *one major difference*. If you selected Lat/Long point type in Step 2, you will see only Lat/Long datums to choose from. If you selected UTM/State Plane points, the box will have only these datums to choose from.

Select the datum and click Next to continue


Import
Get Points
Type of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
Select F
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
9 POINT 33.59364 -112.1475 1800 18 CRTD 17:39 07-JUL-04
Step 3: Select Datum / Grid for Import Points
American Projections...
NAD_27_US_WEST
NAD_27_US_EAST
NAD_27_US_CONUS
NAD_27_US_ALASKA
NAD_83
European Projections...
Comments
Lat/Long datum used in western U.S., based on NAD 27
Expand All
Collapse All
Watch Video Help
Close
<< Back
Next >>

-o-

Zone Selection tab

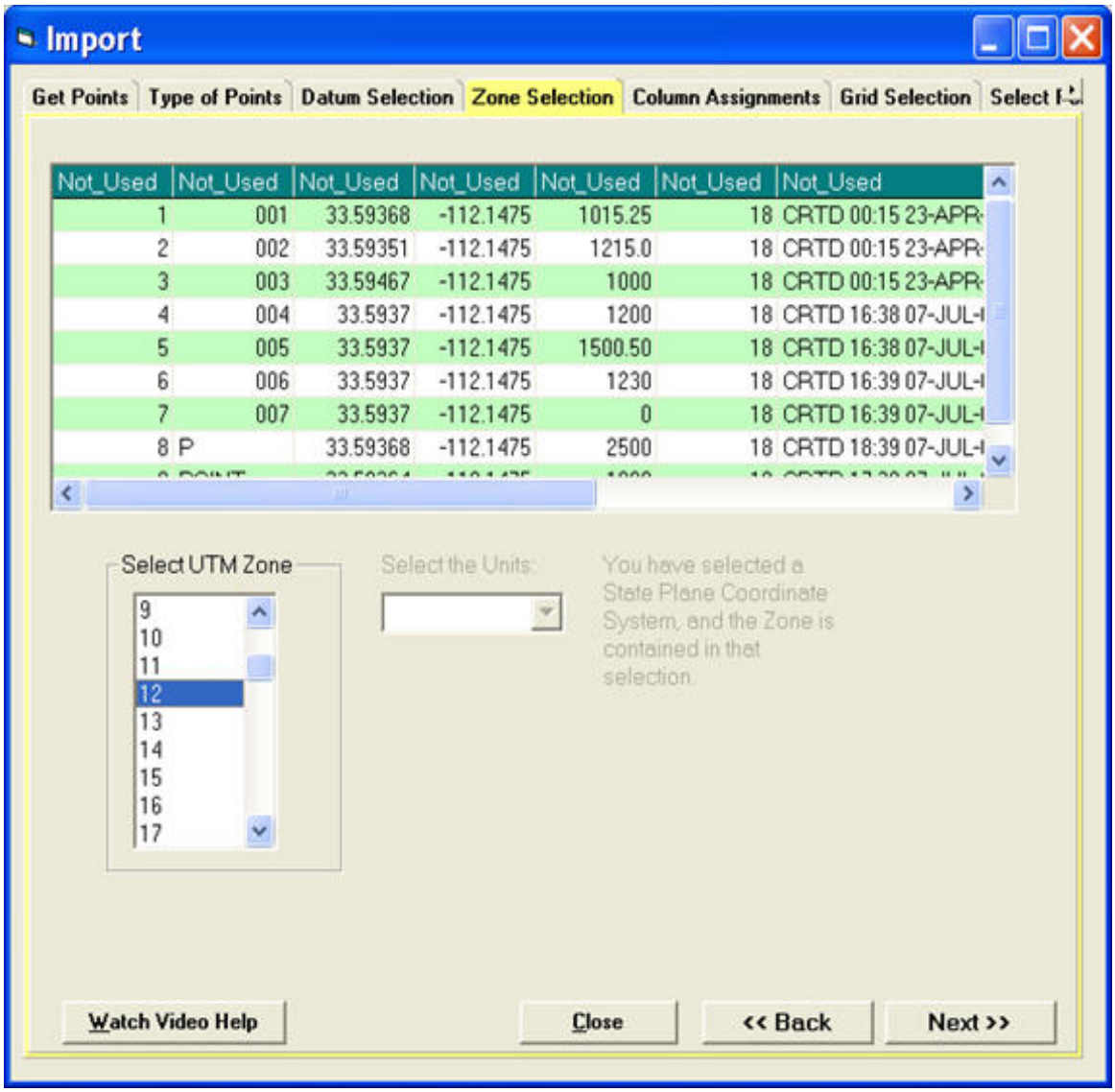
Zone Selection - If you selected UTM / State Plane points in Step 2, you must tell the wizard what zone these points are in. Even if the zone is contained in the text file, you must make the selection manually at this point.

You must also tell the wizard what units the grid is in.

If you chose a State Plane coordinate system in Step 3, the Zone designated is implicit in the

selection you made. The Zone selection box will be disabled.

Notes:
1. All the points must be in the SAME zone.
2. Only Numeric Zone designations are used. If there is a letter designator with the zone, ignore it.


Import
Get Points
Type of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
Select F
Not_Used Not_Used Not_Used Not_Used Not_Used Not_Used Not_Used
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-
Select UTM Zone
9
10
11
12
13
14
15
16
17
Select the Units:
You have selected a State Plane Coordinate System, and the Zone is contained in that selection.
Watch Video Help
Close
<< Back
Next >>

-o-

Column Assignments tab

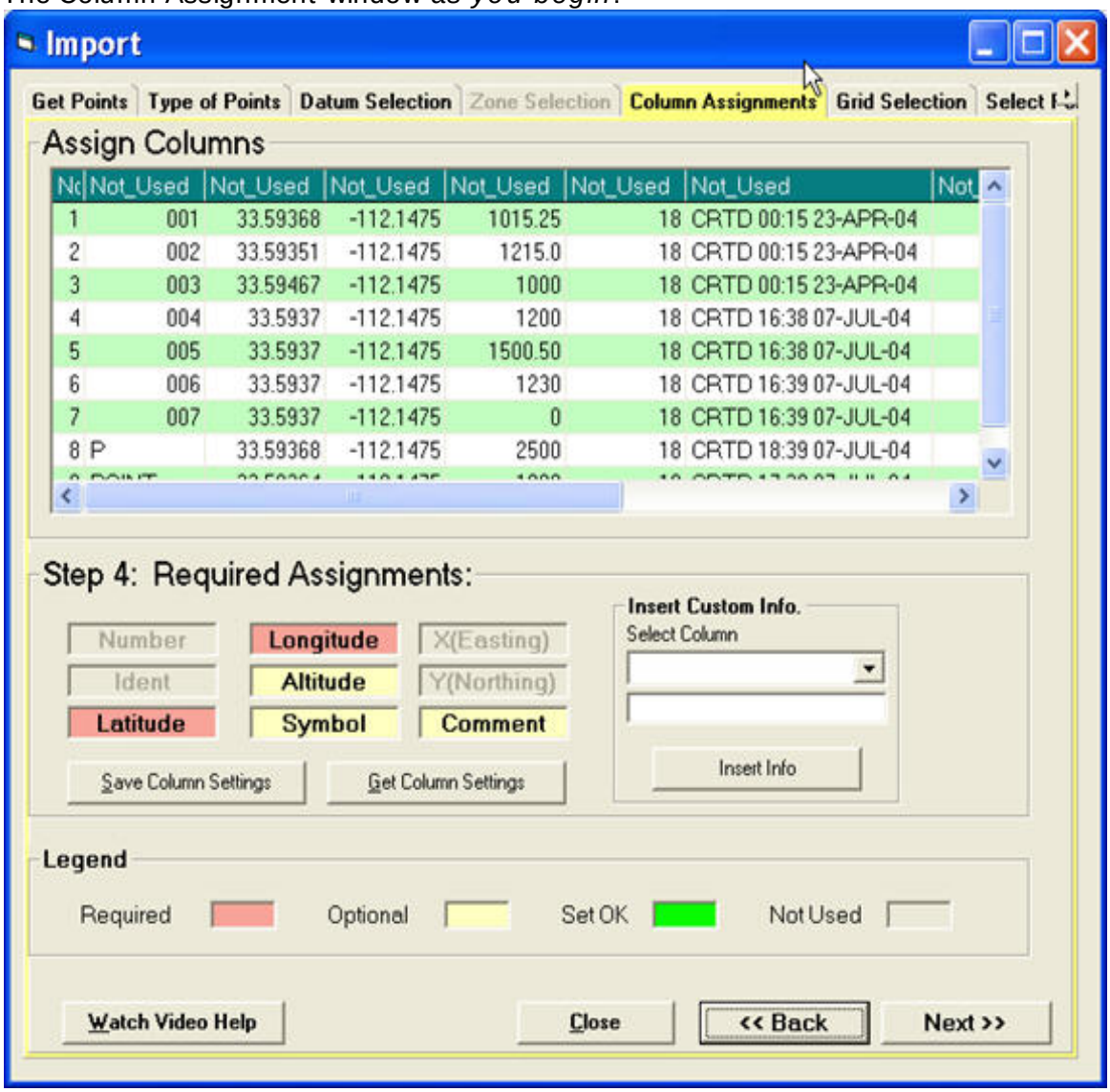
Step 4 - Required Assignments

This tab is the real "work horse" of the import process and the point at which you tell the wizard what each column of the file contains. Based on the type of file you are importing and the selections you have made so far, the color coded labels show which column assignments you need to make. A red label indicates you MUST make that designation, a yellow label indicates that selection is Optional, and a green label indicates it has been made correctly.

It is at this point where you can "weed out" columns you don't need, by setting them to

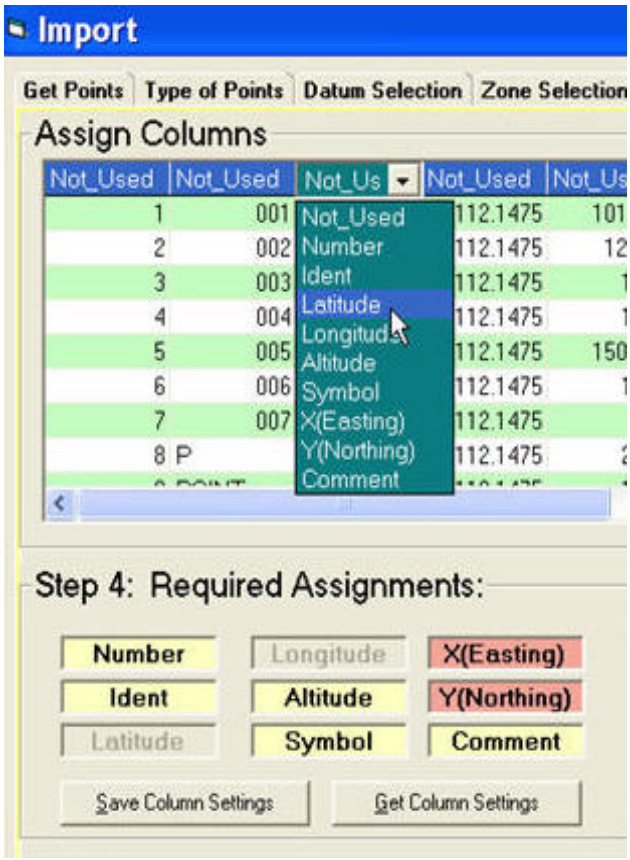
"Not_Used".

The Column Assignment window *as you begin*:

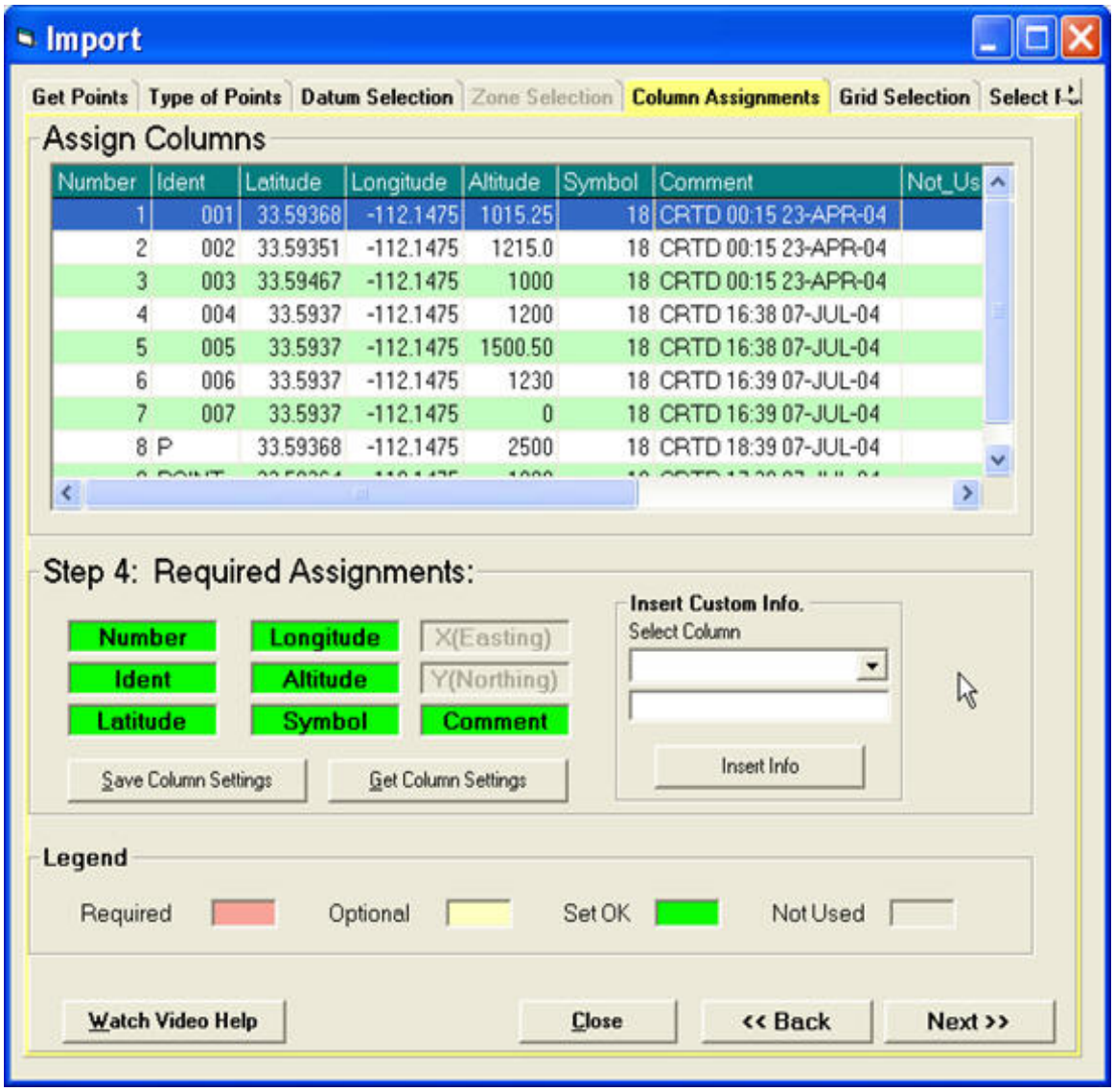


To designate what each column contains, click in each cell of the top, dark green grid row. A drop down box will appear, and you can scroll to designate what that column contains. Note that the columns default to Not_Used. You need only make the designations indicated by the color coding, and as you make them the required assignments label will turn green

Making a column selection:



The column assignment window with *all the selections made*:

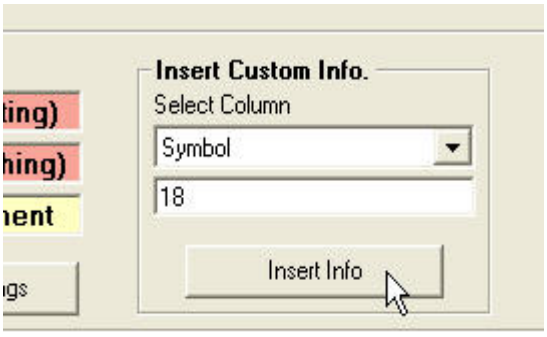


Insert Custom Info

In some situations you may need to overwrite (or supply) custom information into the text file. This control will allow you to place this information into the grid. The information will be place in all the rows in the grid (i.e. you can't place it in only some points) A good example of this would be to make a Symbol designation for all the points.

To use this control,

1. Select the Column the information will be place into
2. Type the custom information into the text box below
3. Click Insert Info., and the information will be written into the grid.



Save Column Settings, Get Column Settings

Frequently you will be working with just one type of import file, and the column settings will be the same every time. This control allows you to reuse these settings.

Once you make the first Column Assignments, you can save them to a .set file. To use them again, just click the Get Column Settings button and select the file. The column assignments will be made automatically, and all the required text boxes should turn green.

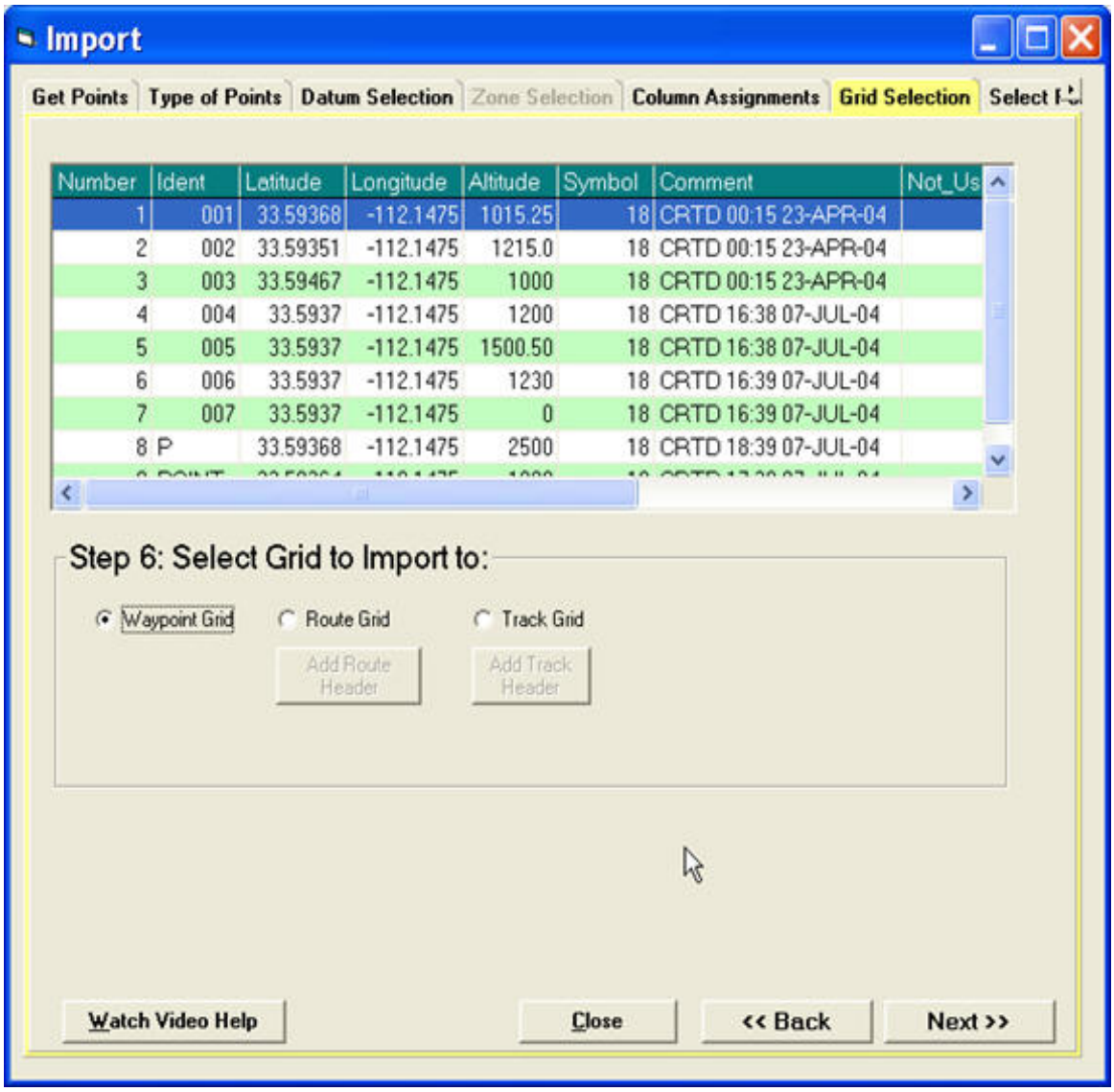
-o-

Grid Selection tab

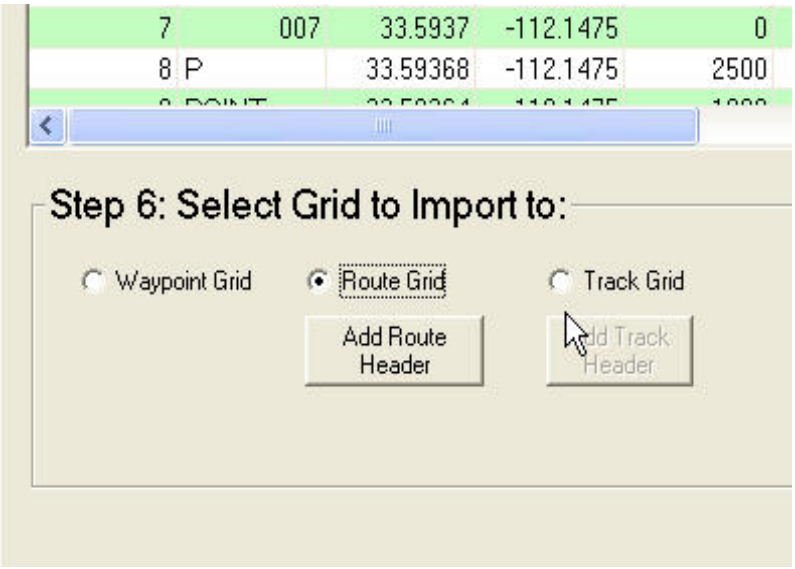
Step 5 Select Grid to Import to

Yes, there's a typo error. The frame should read "Step 5".

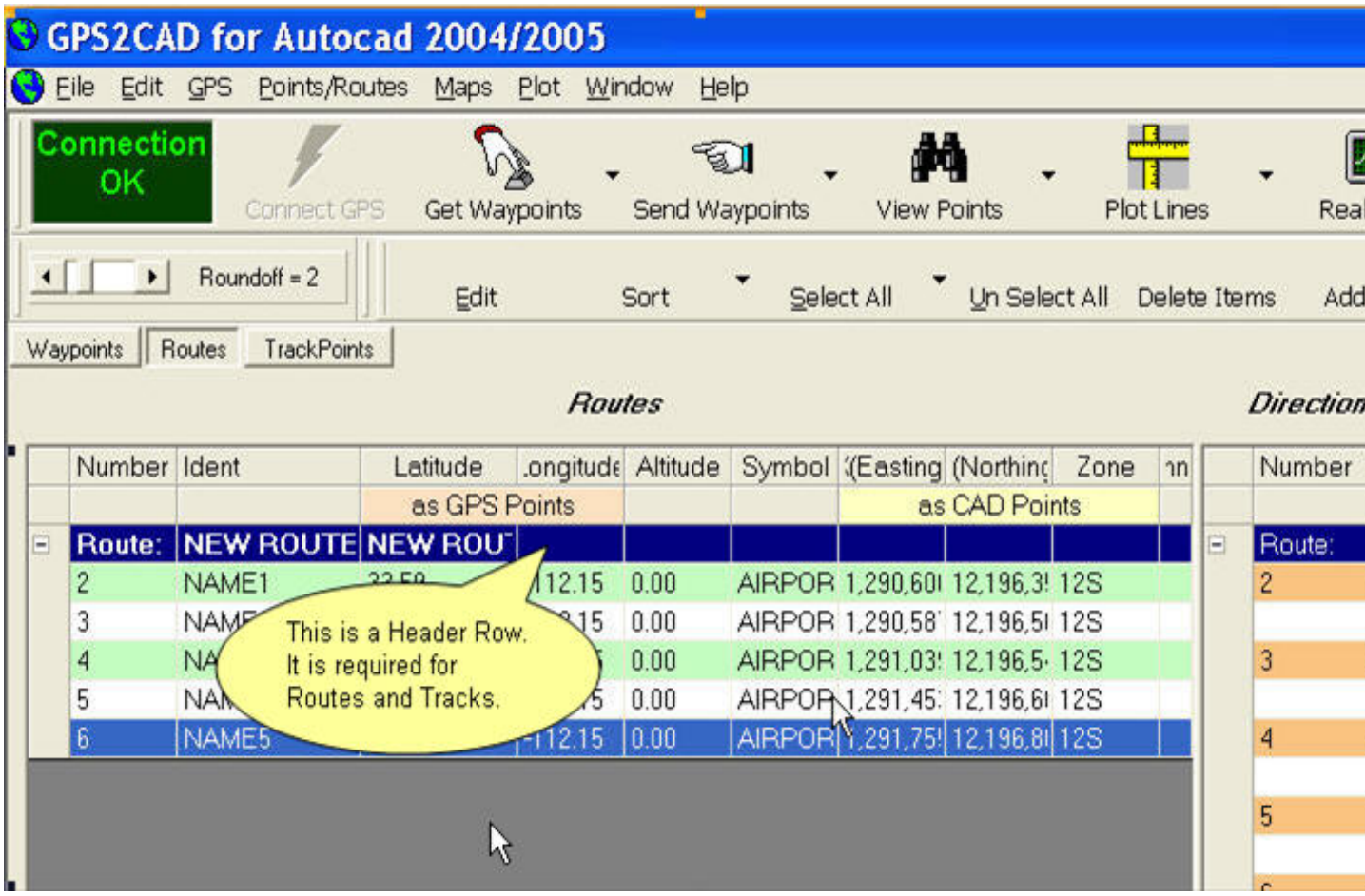
In this tab you tell the wizard where to put the points in the main grid. In most cases they will go into the waypoint grid, however you may also put them into the Route or Track grid.


Import
Get Points
Type of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
Select F
Number Ident Latitude Longitude Altitude Symbol Comment Not_Us
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
Step 6: Select Grid to Import to:
Waypoint Grid
Route Grid
Track Grid
Add Route Header
Add Track Header
Watch Video Help
Close
<< Back
Next >>

If you place them into the Route or Track grid, you may need to add a route or track header row to the grid that is the target of the import. You may do so by clicking the "Add Route Header" or "Add Track Header" button.



This picture illustrates what a "Header Row" is in the main grid



Once you have supplied the necessary information, click Next to continue.

-o-

Select Points tab

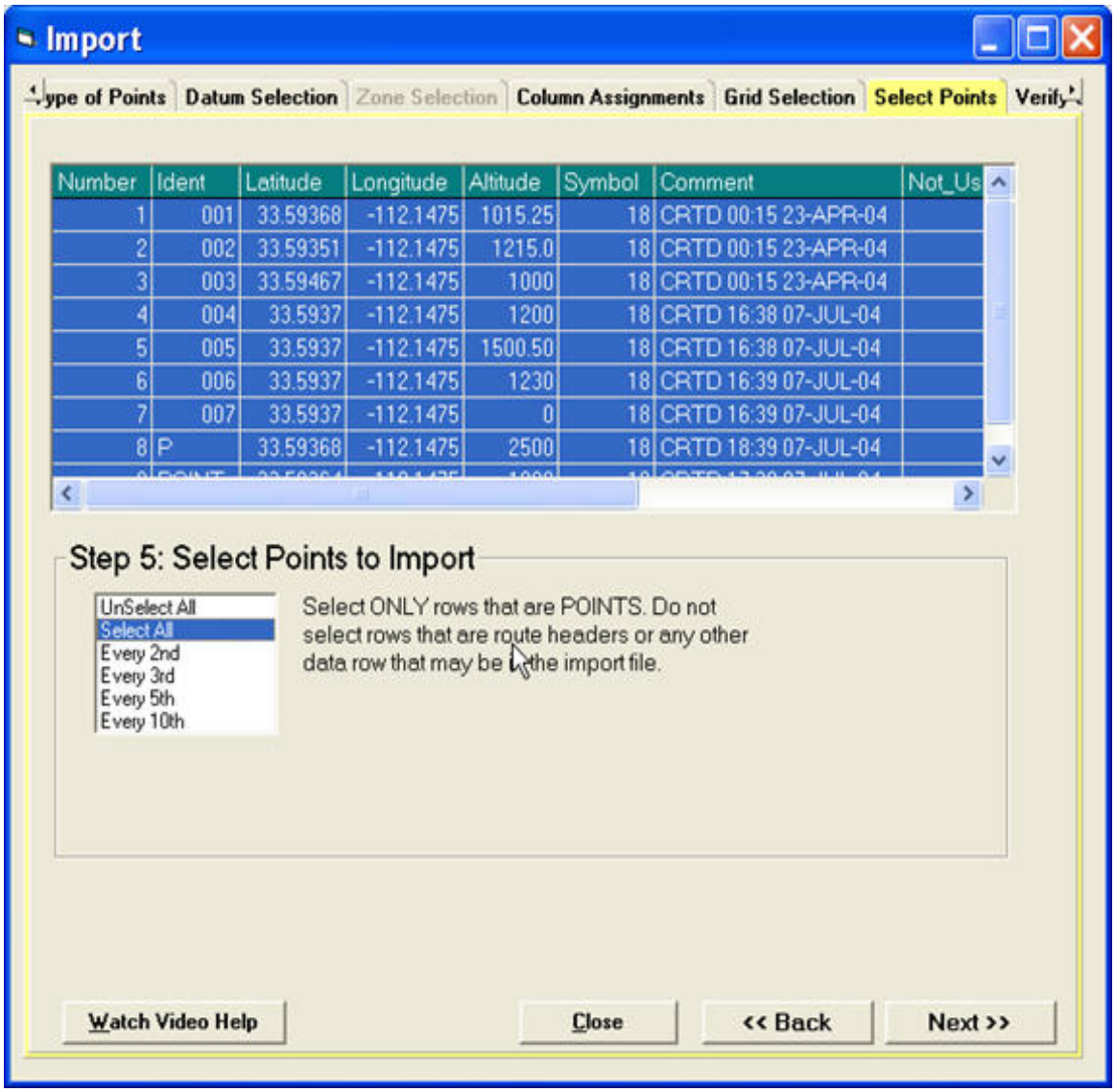
Step 6 Select Points to Import

Yes, there's a Typo error. The frame in the window should be Step 6

On this tab you select which points or rows to import. You may click and drag, or use the selection box.

IMPORTANT NOTE! It is at this point where you can de-select rows that do not contain valid point data. Import only rows that are valid points!

Click Next to continue.


Import
ype of Points
Datum Selection
Zone Selection
Column Assignments
Grid Selection
Select Points
Verify
Number Ident Latitude Longitude Altitude Symbol Comment Not_Us
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
Step 5: Select Points to Import
UnSelect All
Select All
Every 2nd
Every 3rd
Every 5th
Every 10th
Select ONLY rows that are POINTS. Do not select rows that are route headers or any other data row that may be in the import file.
Watch Video Help
Close
<< Back
Next >>

-o-

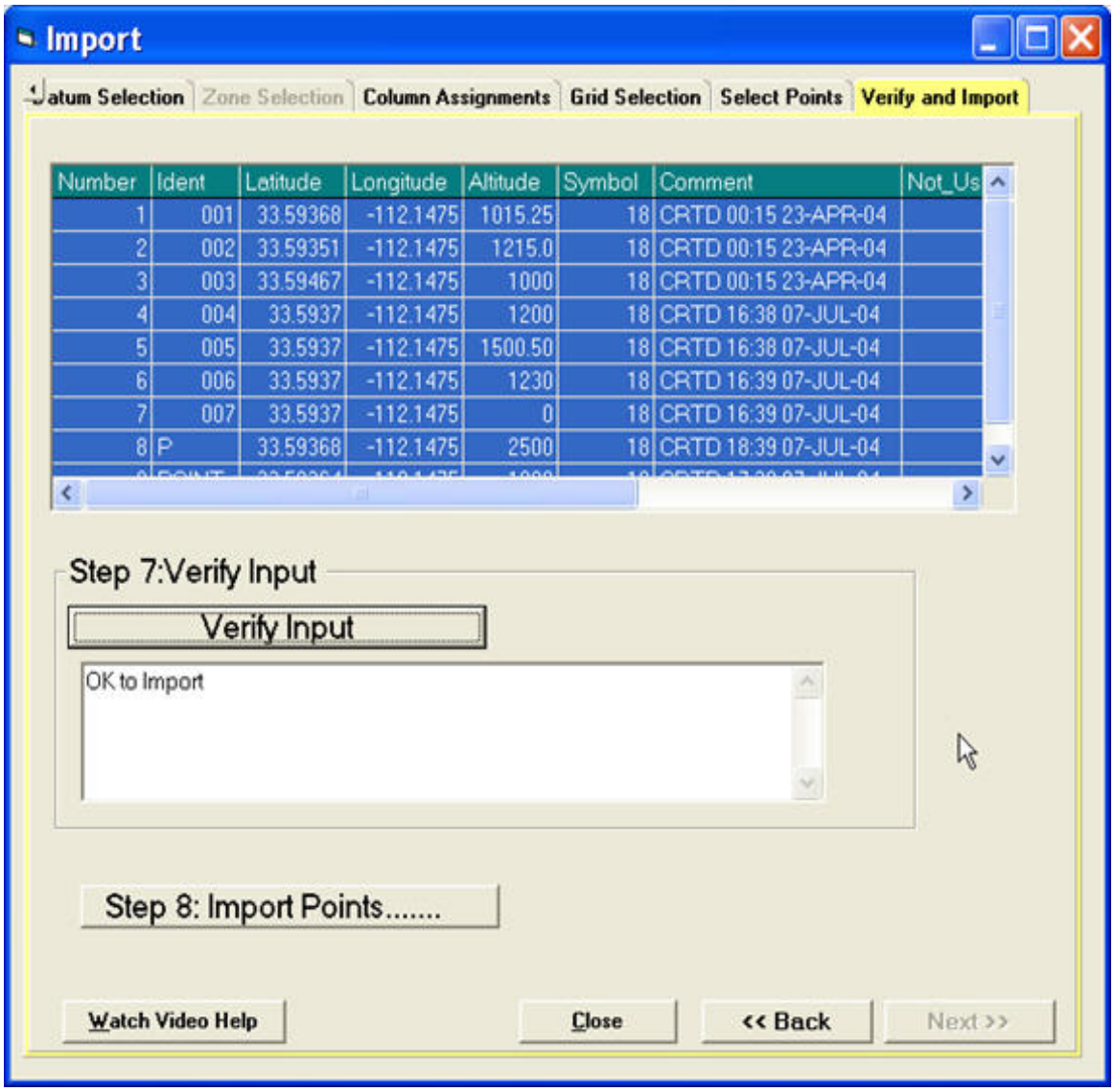
Verify and Import tab

Step 7 and 8 - Verify Input and Import Points

The last tab in the wizard requires you to verify the input you have made. The Import points button will not be enabled until the text box reads "OK to Import", indicting it has passed the Verify test.

The Verify Input button performs several checks to validate the choices you have made, and the integrity of the data. If it finds an error, you will see a message in the text box describing the error and it's location. Return to that point in the wizard to correct it, and try the Verify button again.

Once the Import Points button is enabled, you can click it to import the points (Finally!). Return to the main program window to view the points that have been imported.


Import
atum Selection
Zone Selection
Column Assignments
Grid Selection
Select Points
Verify and Import
Number Ident Latitude Longitude Altitude Symbol Comment Not_Us
1 001 33.59368 -112.1475 1015.25 18 CRTD 00:15 23-APR-04
2 002 33.59351 -112.1475 1215.0 18 CRTD 00:15 23-APR-04
3 003 33.59467 -112.1475 1000 18 CRTD 00:15 23-APR-04
4 004 33.5937 -112.1475 1200 18 CRTD 16:38 07-JUL-04
5 005 33.5937 -112.1475 1500.50 18 CRTD 16:38 07-JUL-04
6 006 33.5937 -112.1475 1230 18 CRTD 16:39 07-JUL-04
7 007 33.5937 -112.1475 0 18 CRTD 16:39 07-JUL-04
8 P 33.59368 -112.1475 2500 18 CRTD 18:39 07-JUL-04
Step 7:Verify Input
Verify Input
OK to Import
Step 8: Import Points.....
Watch Video Help
Close
<< Back
Next >>

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Exporting Points

Exporting points is done in a five step wizard. Points may be exported from any of the main grids, into a variety of formats, including .dxf files.

DXF files are the interchangable format that allows your data to be used in many other CAD applications, such as AutoCAD LT, TurboCAD, IntelliCAD, Microstation, and others.

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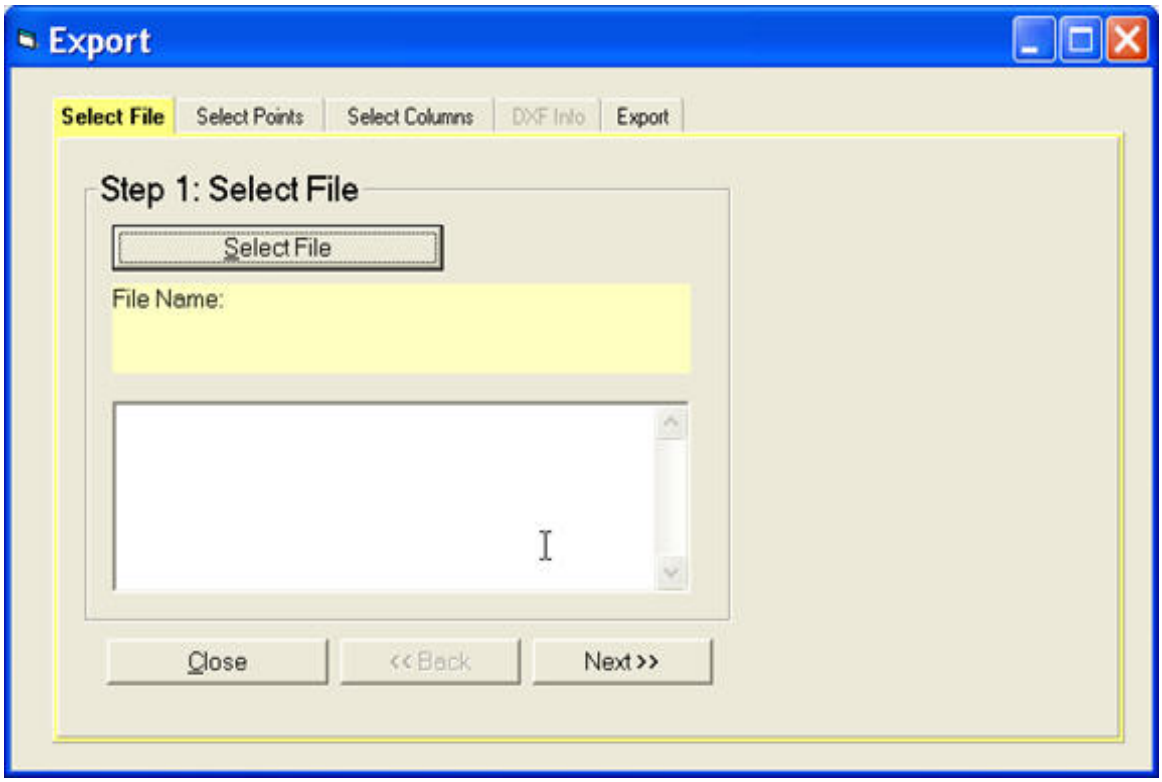
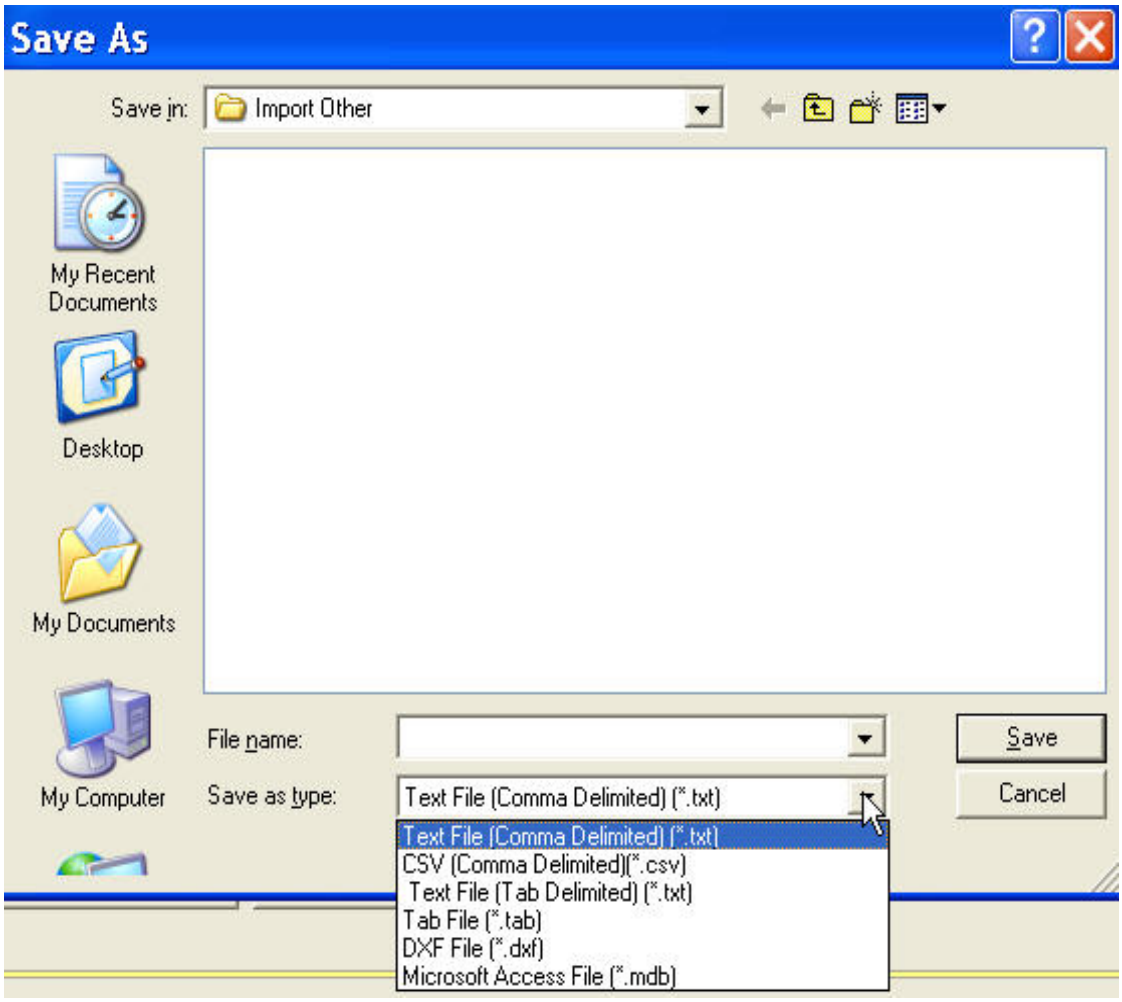
Select File

Step 1: Select File

To begin the export process, go to File/Export Points. The first window of the Export wizard appears with the "Select File" tab active.



Click the Select File button and choose the file type from the drop down box, then select the file:



Click Save, then Next to continue.

-o-

Select Points

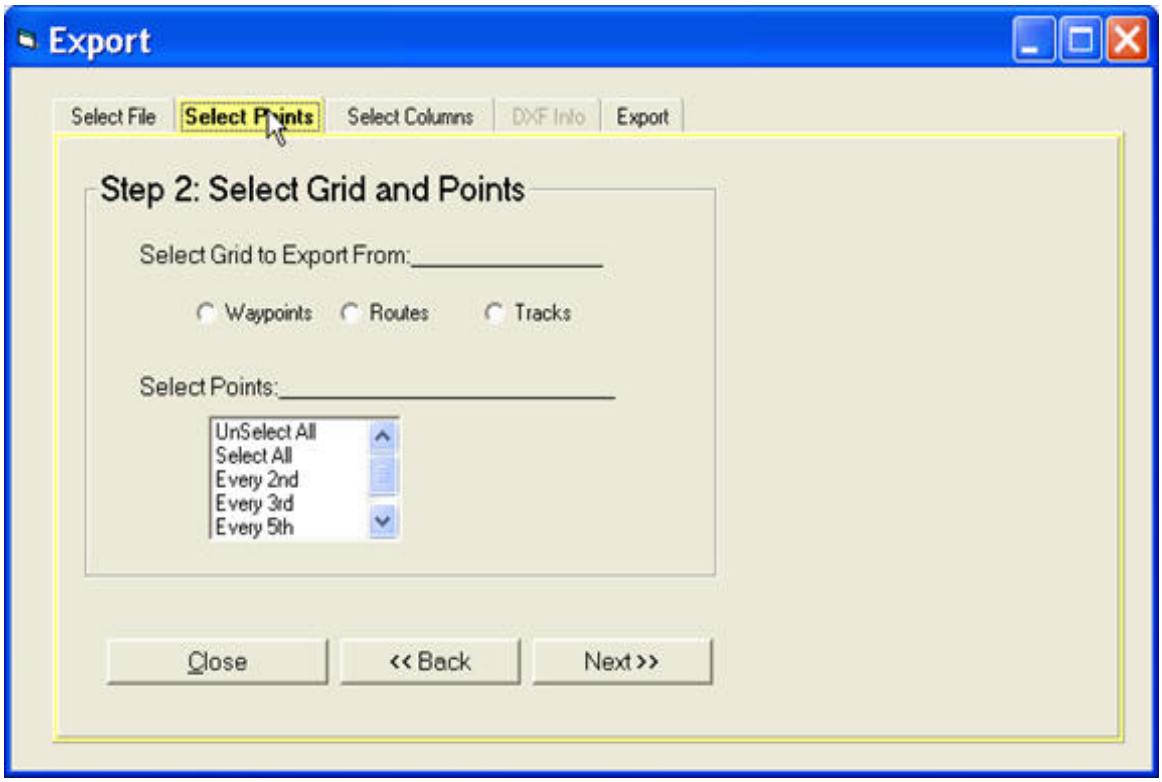
Step 2: Select Points

The second tab lets you designate the grid that you are exporting from, and then make a selection of the individual rows/points that you are exporting.

Selection may also be made directly on the grid by click and drag.

Do NOT export header rows if you are exporting from the routes or tracks grid. Select only the point rows. If you select a header row it will be ignored.

Click Next to continue.



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Select Columns

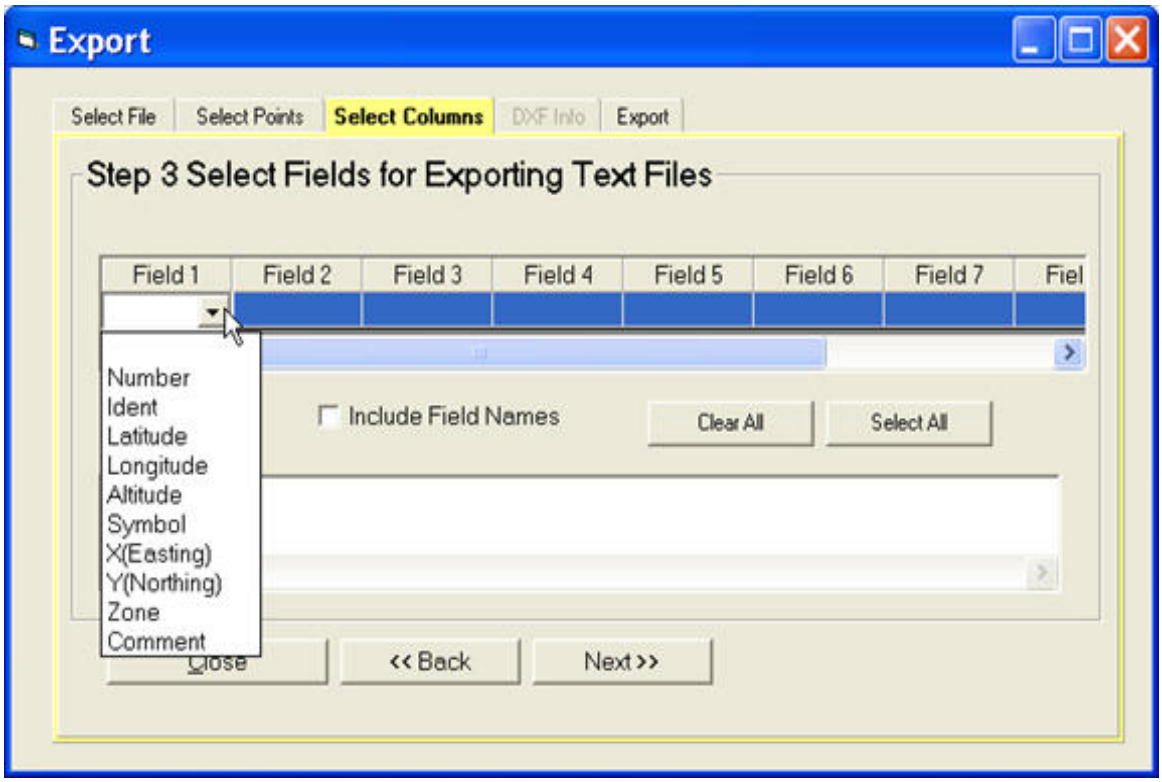
Step 3: Select Fields for Exporting Text Files

This tab lets you choose which columns you will export. To designate the columns, click in the second row of the grid and a drop down box will appear. Select the Column you wish to appear in this position.

The files will contain only the columns that you designate. The delimiter in the text file is based on the type of file you chose in step 1.

The check box "Include Field Names" will place a line at the top of the text file containing the column names that are used. We recommend selecting this, as it is very helpful when viewing the file from other programs such as Notepad. The line can always be deleted with a text editor.

Click Next to continue.



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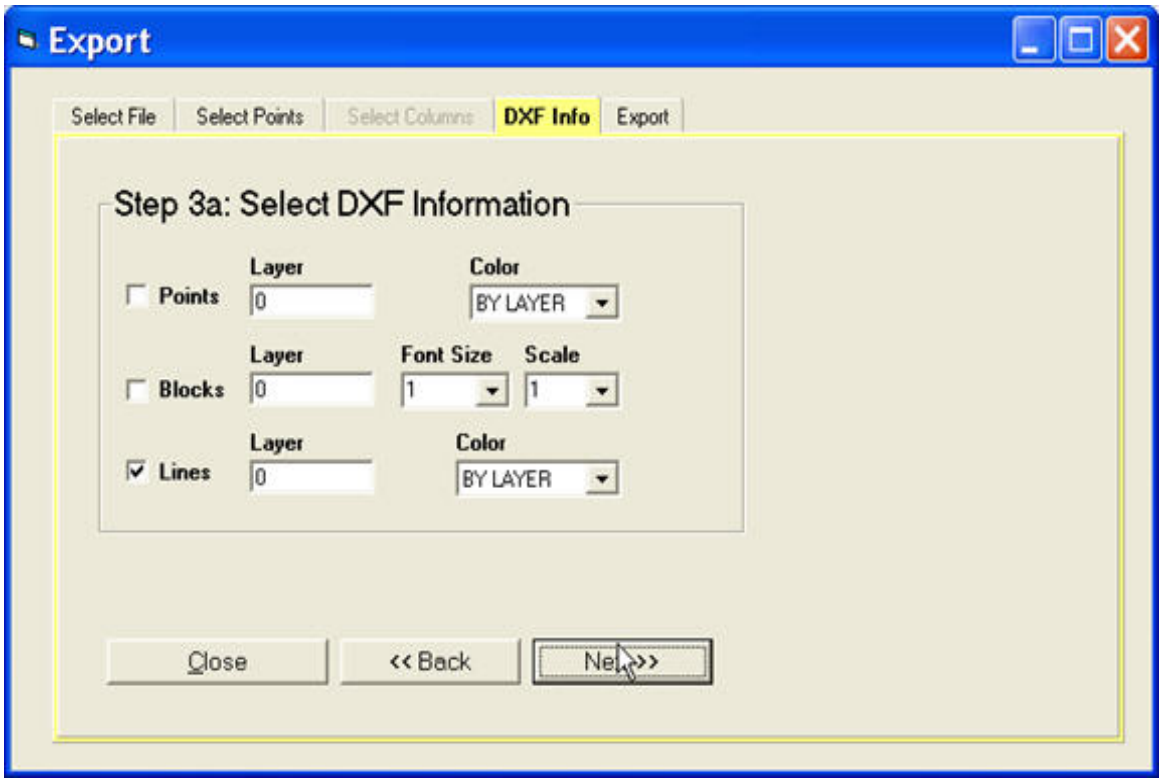
DXF Info

Step 3a: Select DXF Information

If you are exporting a DXF file, this tab will be enabled. It is here that you may choose the additional DXF information required by CAD programs. You may export the data as points, blocks, or lines, or any combination. The Layer, color, and Font information should also be selected.

Click Next to continue.



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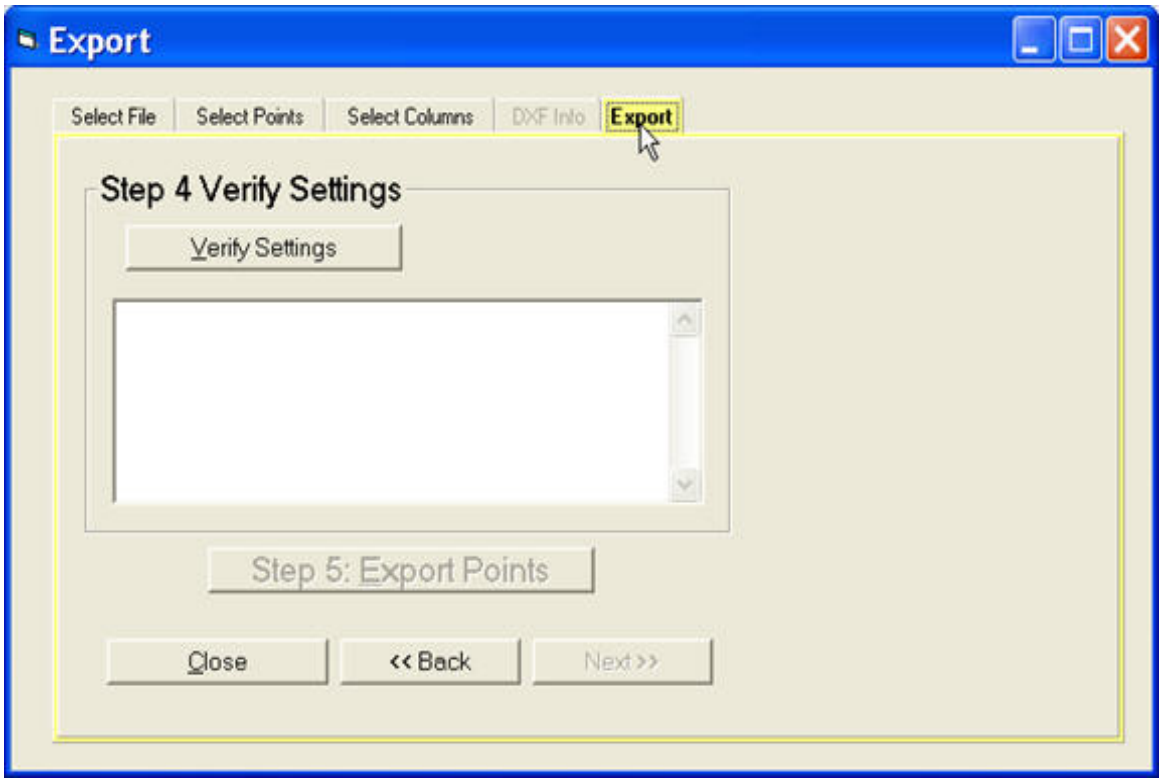
Export

Steps 4 and 5: Verify Settings and Export Points

This is the last tab in the Export wizard. First click the Verify Settings button to insure that you have supplied all the necessary information.

If there is a problem with the input information, you will be given a notice and location in the text box.

Once this test is passed, the Export Points button will be enabled.



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Knowledgebase and FAQ's

Knowledgebase and FAQ's

Knowledge base and FAQ's are maintained on the GPS2CAD website so they can be kept current.

Click Here

-o-

The FUN Stuff

FUN Activites

Geocaching: "Geocaching" is one of the new outdoor sports that has grown up around GPS units. It is essentially a GPS style treasure hunt, where your GPS unit is used to guide you to the cache. Actually, it's quite fun, and great reason to get outdoors, and play with your "toys". Naturally, a whole community has grown up on the Net, and probably the most common one is www.Geocaching.com.

The "Degree Confluence Project": Confluence.org: Somewhere along the way people began to wonder "What's at 32 deg.N/-112degW" - or something like that. The effort is to photograph all the even degree Latitude/Longitude locations on earth. Confluence.org is a website where this is conducted, and the photographs are posted. If you want to participate, pick an even

Lat/Long locations, use your GPS to go there, photograph it, (along with your GPS unit for proof), and send it in!

There are of course many other activities for having fun with your GPS and your copy of GPS2CAD. We'd love to hear from you!

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The OTHER Stuff

GPS2CAD Supported Projections

Supported Grids (Map Projections)

American Projections		
	UTM based on NAD_27	UTM_NAD_27
	UTM based on NAD_83	UTM_NAD_83
	SPCS 27 - State Plane Coordinate System from 1927. Based on the NAD_27 datum.	SPCS_27
	SPCS 83 - State Plane Coordinate System from 1983. Based on the NAD_83 datum.	SPCS_83
European Projections		
Austria	**Bundesmeldenetz (BMN)**.	AUSTRIAN_GRID_M28 AUSTRIAN_GRID_M31 AUSTRIAN_GRID_M34
Dutch	**Rijksdriehoekstelse (RD)** based on the AMERSFOORT datum	DUTCH_GRID
Finnish	**Kartastokoordinaattijärjestelmä, KKJ**. Based in the FINLAND_HAYFORD datum.	FINNISH_GRID_ZONE_1 FINNISH_GRID_ZONE_2 FINNISH_GRID_ZONE_3 FINNISH_GRID_ZONE_4
French	**Lambert (NTF)**	FRENCH_GRID_ZONE_1 FRENCH_GRID_ZONE_2 FRENCH_GRID_ZONE_3 FRENCH_GRID_ZONE_4 FRENCH_GRID_ZONE_2_ETENDU FRENCH_GRID_GRAND_CHAMP
	Lambert 93 (RGF93).	FRENCH_GRID_RGF_93
Germany	**Deutsches Haupt Dreiecks Netz, DHDN (Potsdam)**	DHDN
Italy	Gauss-Boaga. Based on the ROME_40 datum	ITALIAN_GRID_ZONE_1 ITALIAN_GRID_ZONE_2
Luxembourg	Based on the **LUREF** datum.	LUXEMBOURG_GRID

Norway	Based on the NGO_48 datum	NORWEGIAN_GRID_ZONE_1 NORWEGIAN_GRID_ZONE_2 NORWEGIAN_GRID_ZONE_3 NORWEGIAN_GRID_ZONE_4 NORWEGIAN_GRID_ZONE_5 NORWEGIAN_GRID_ZONE_6 NORWEGIAN_GRID_ZONE_7 NORWEGIAN_GRID_ZONE_8
Belgium	**Belge Lambert 1972**.	BELGIUM_GRIDBELGIUM_GRID
Britain	**British National Grid, BNG** Based on the OSGB_36 datum.	BRITISH_GRID
Ireland	**Irish Grid**. Based in the IRELAND_65 datum.	IRISH_GRID
Sweden	**Swedish Grid, Rikets Nät (2.5 gon V)**. Based on the **RT90** datum.	SWEDISH_GRID
Swiss	**Swiss Grid**. Based on the **CH1903** datum.	SWISS_GRID SWISS_GRID_LV95
Pacific Projections		
Australia	**Australian Map Grid (AMG 84)** based on the AGD_84 datum (improved version of AGD 66).	UTM_AMG_84
	Map Grid Australia (MGA 94) based on the geocentric GDA_94 datum. The difference to AMG 84 is about 200 meters.	UTM_MGA_94
New Zealand	**New Zealand Map Grid (NZMG)** based on the NZGD_49 datum NZMG	NZMG
	New Zealnd Transverse Mercator (NZTM) based on the NZGD_2000 datum.	NZTM
Universal Projections		
	Universal Transverse Mercator (UTM) is a global grid (coordinate system) designed to work everywhere except at the poles. It contains coordinates and a Zone designation	
	UTM based on WGS_84 for the northern hemisphere	UTM_NORTH
	UTM based on WGS_84 for the southern hemisphere	UTM_SOUTH
	UTM based on ETRS_89. Used in Europe.	UTM_ETRS_89
	UTM based on ED_50. Older system used in Europe.	UTM_ED_50

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Other Resources

Here are some related links you may find helpfule:

U. S. Geological Survey	The Grandaddy of Map sites

TerraServer-USA	This is where GPS2CAD gets it's maps from
Geocaching.com	The new, all-geek recreation site
Geodetic Datum Overview	A primer on Datums
Geoplace.com	"The authoritative Resource for Spatial Information" ...their words
Geocomm.com	"The GeoCommunity™ is THE place for the Geographic Information Systems (GIS), CAD, Mapping, and Location-Based industry professionals, enthusiasts, and students to gather. " ...their words
GPSworld.com	An excellent magazine about all things GPS. Online and printed.
Ordnance Survey	The British National GPS Network
National Geodetic Survey	Not the same as USGS, but a very interesting Government site.
U.S. Census Bureau	This is where GPS2CAD's Tiger maps come from
Trails.com	A great outdoor site

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Index

- A -

About Map Scale/Zoom 39
About using the maps in AutoCAD 40
ACAD Settings 12
Add Points 37

- C -

Column Assignments tab 59
Connecting to GPS 14

- D -

Datum Selection tab 58
Deleting points on Map 38
Downloading Points and Routes 16
DXF Info 71

- E -

Export 72
Exporting Points 67

- F -

Features 8
FUN Activites 73

- G -

Get Points tab 55
Getting Points from AutoCAD 25
GPS Units 11
GPS2CAD Supported Projections 74
Grid Columns 18
Grid Selection tab 63
Grids and Units 9

- I -

Importing and Exporting data 46

Importing from Garmin's MapSource 49
Importing from Magellan's MapSend
Importing from Other 55
Importing Points FROM AutoCAD 47
Introduction 46

- K -

Knowledgebase and FAQ's 73, 73

- M -

Main Window Controls 21
Map Window Controls 31
Maps 28
Misc 12
Moving Points in the grid 27

- O -

Open/Save Projects 14
Other Resources 75

- P -

Points and Routes 25
Preferences 9
Print Preview 44
Print Setup 45
Printing 43, 43
Purchase On Line 6
Purchasing 6

- Q -

Quick Start 4

- R -

Real Time Capture 40
Round-off 23

- S -

Sample Maps 28
Select Columns 70
Select File 67
Select Points 69
Select Points tab 65

Sending Points TO AutoCAD 24
Sorting Points 20
Splash Screen 13

- T -

Tour 7
Type of Points tab 56

- U -

Upgrading 6
Using the Preview Map 33

- V -

Verify and Import tab 66
Video Help 4

- W -

Welcome 3
What's New 3
Working with AutoCAD 24

- Z -

Zone Selection tab 58

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